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PROCEEDINGS OF THE CONVENTION OF
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MILLERS

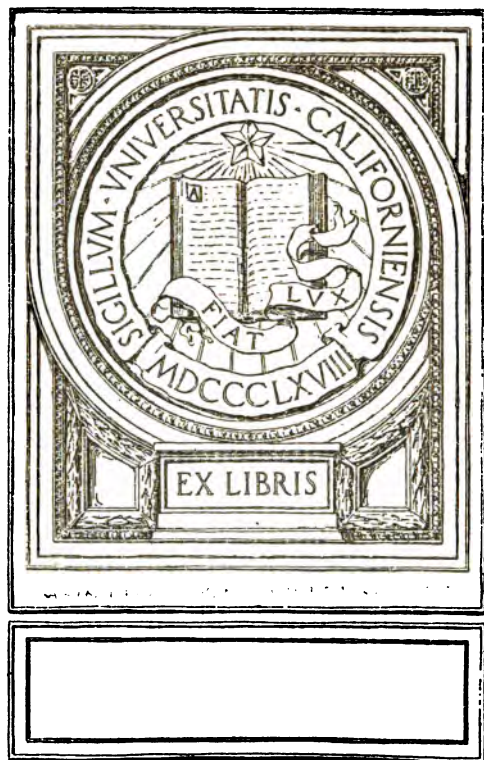
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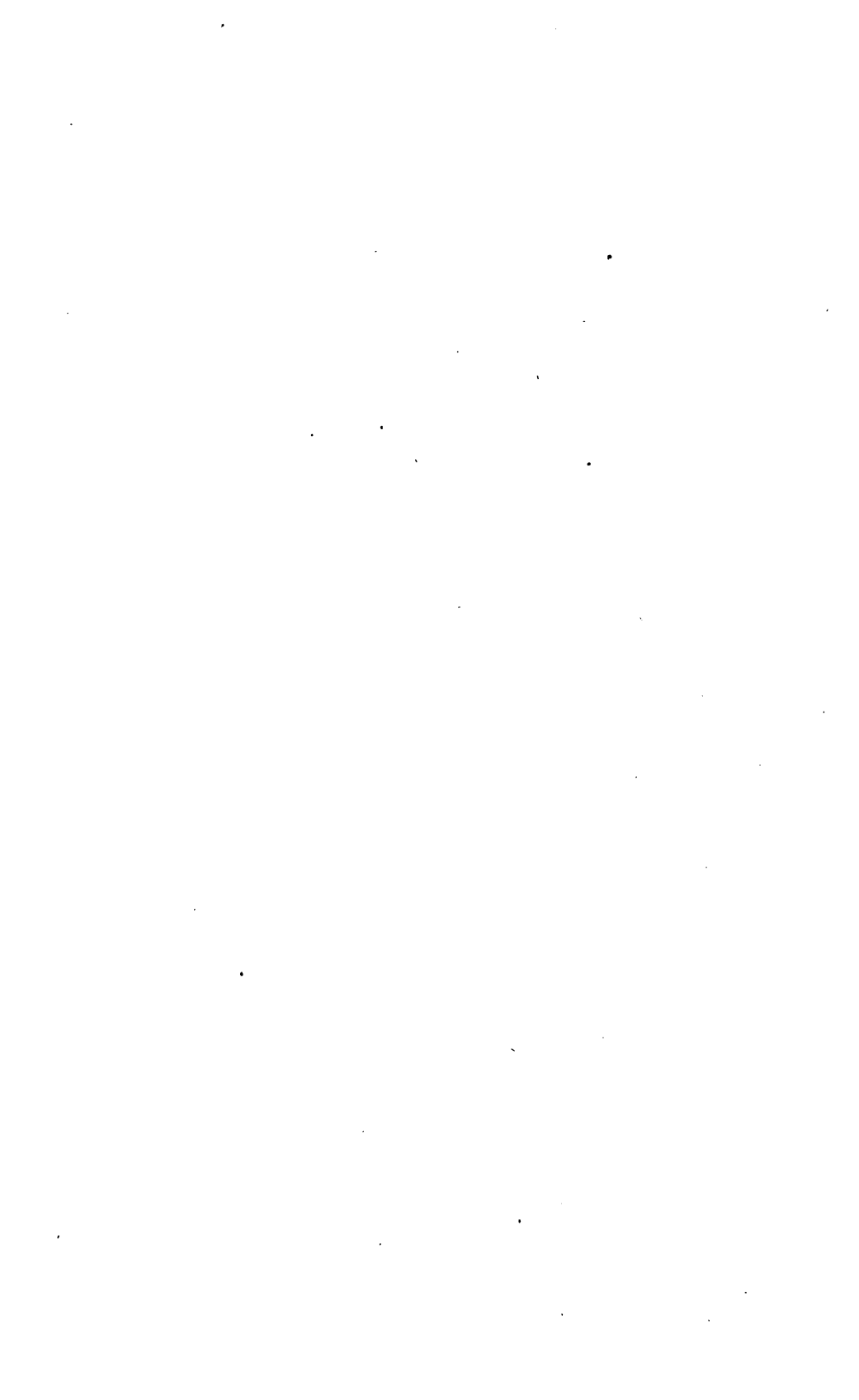
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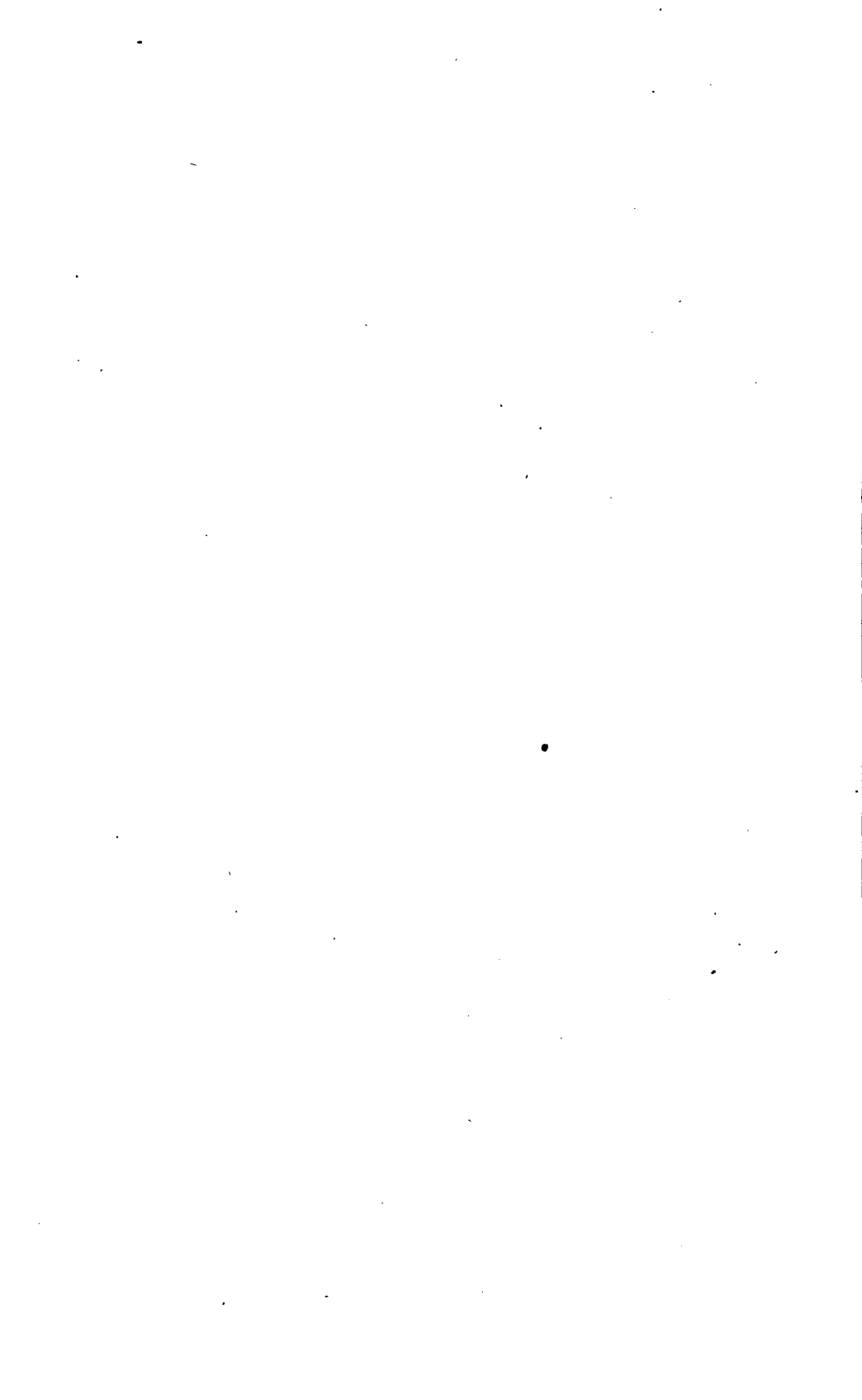
HELD IN THE COLLEGE CHAPEL, ADMINISTRATION
BUILDING, STATE COLLEGE

PULLMAN, WASHINGTON,
THURSDAY AND FRIDAY, JANUARY 11, 12
1906

YC 60450







**PROCEEDINGS OF THE CONVENTION OF
PRODUCERS, SHIPPERS AND
MILLERS**

OTHERWISE KNOWN AS THE

“WHEAT CONVENTION”



**HELD IN THE COLLEGE CHAPEL, ADMINISTRATION
BUILDING, STATE COLLEGE**

**UNIV. OF
CALIFORNIA**

**PULLMAN, WASHINGTON
THURSDAY AND FRIDAY, JANUARY 11, 12
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**Officers of the Producers, Shippers and Millers
Association of Washington:**

President—R. O. McCroskey of Garfield.

Vice-President—A. J. Stone of Rosalia.

Secretary—S. O. Armstrong of Colfax.

Treasurer—M. H. Houser of Pomeroy.

Executive Committee—

E. E. Elliott of Pullman.

J. W. Frye of Davenport.

J. T. Bibb of Tacoma.

70 yvu
AUGUST 1906

INTRODUCTION

The wheat industry of the State of Washington is of such preeminent importance that it is a wonder that no effort to combine those engaged in it has heretofore been made. Producers have gone steadily on increasing the area and yield of production. Shippers have steadily handled the crop, always ready for controversy with transportation companies. The railroads have done their best to handle the increasing output, the millers have kept their wheels turning, and the exporters have taken care of the fleets of ships attracted to our shores by reason of this great product. But until the present year no effort has been made to draw all of these varied and diverse interests, each of them dependent on this great agricultural product for its welfare, into a conference that might result for the mutual good of all. During the latter part of 1904 this idea occurred to certain members of the faculty of the Washington State College, and after considerable correspondence and consultation on the subject it was decided to call such a convention for the purpose of bringing together all those in any way interested in the production and handling of this most important product of the state. It was decided to call the convention under the auspices of the College and Experiment Station, in which matters of interest relating to this business could be thoroughly discussed, and the men engaged in it could have the opportunity of mingling together and each would have an opportunity of finding out what the other thought about himself and what he would consider essential for the welfare of the industry. After mature consideration this convention was called for the 11th and 12th of January, 1906. The cooperation and assistance of a large number of people throughout the state was secured and the proceedings of this convention, which was one of the most successful of its kind, are published in the following pages.

The primary object of this convention was educational. It was not a gathering to discuss grievances or to plan any revolutionary action calculated to benefit any single member who might be in attendance. The program was planned to give everyone a fair show and a perusal of the following pages will reveal the fact that this purpose was conscientiously carried out by those having the program in charge. We are glad to present to our readers this bulletin of the first wheat convention ever held in the state of Washington and to announce the organization of the Grain Producers, Shippers and Mill-

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ers Association of Washington. We believe this movement a timely one and one which will result in bringing about larger development and an increased interest in the proudction of the various cereals which have done so much to build up the state.

For the Association, } E. E. ELLIOTT,
 } JOHN T. BIBB,
 } J. W. FRYE,
 Executive Committee.

to you
AMERICAN



1. J. T. Bibb, Tacoma, Member Ex. Com.
2. S. C. Armstrong, Colfax, Secretary.
3. J. T. Frye, Davenport, Member Ex. Com.
4. D. F. Anderson, Rosalia, State Grain Com.

5. A. J. Stone, Rosalia, Vice President.
6. M. H. Houser, Pomeroy, Treasurer.
7. J. W. Arrasmith, Colfax, State Grain Com.
8. W. H. Reed, Spokane, State Grain Com.

to you
anxious

PROCEEDINGS OF THE CONVENTION.

Pursuant to call the convention assembled in the Chapel of the State College at 10 a. m., Thursday, January 11, 1906.

President Bryan being absent was unable to give the opening address according to the program, consequently Professor E. E. Elliott welcomed the convention in his stead and gave a review of the "Wheat Situation." He said in part:

"The call of a convention of wheat producers, shippers and millers is an event of the utmost importance to the greatest money producing industry of Eastern Washington. The present convention has its birth in a desire on the part of the College to bring together, so far as possible, representatives of all the lines of industry interested in the production and handling of this wealth. The present convention has no political significance whatever. Its object is purely educational. It is believed that by the bringing of these different interests together and lining them in a campaign of education that an increased stimulus to the industry will be the inevitable result. In times past there have been occasions when those engaged in these different lines might not have believed that on the part of others they were receiving the fairest treatment possible. In fact there have been times when the shipper was considered by the producer as little less than a pirate, while the transporter and miller were of so avaricious a character that they were beyond mentioning in the class of honest men. We believe that at the present time such an acute state of feeling is not to be found anywhere, and we believe further that by a gathering such as this wheat convention all these various interests will become better acquainted and get along infinitely better. In this spirit the College wishes to welcome the convention to its halls. It wishes to bring to bear upon this great industry the knowledge which some of its workers and experimenters have already acquired. It wishes to open to a certain extent the mysteries of science so far as they relate to the production of this great cereal. It wishes these visitors to learn what the College is trying to do for the wheat producers, shippers and millers of the state. In order to do this all its workers have spent much time in preparing such information as we may possess in an acceptable manner for this program. It has also invited a large number of men, all of them practical, active workers in some part of this great field of industry. The program as prepared contemplates the study of this cereal from the time it

goes into the soil until it is in the baker's hands. The region which is represented by those who are gathered here is one of the most fertile in the world, and experience shows that it is practically adapted to wheat. No matter what future developments may show, we incline to the belief that for many years to come this industry will be the leading one for the farmers of Eastern Washington. Consequently any study of the subject which will tend to the improvement of methods of production, increase in the yield, greater returns in the market and improvement in the manufactured product will be of vast benefit, not only to those particularly interested in this industry, but to the state at large. Some of the most serious problems which affect the production of wheat will here be discussed, both from the standpoint of the farmer and of the scientist, who may be trying to solve the problem in a scientific manner. Varieties of wheat, new as well as old, will be discussed. Systems of handling, storing and shipping will have a place on the program. Economical problems relating to the question of transportation, both on the common highways as well as on railroads and sea-going vessels, will be handled by men well versed along these lines. When it comes to the discussion of the milling of wheat we will have the experience of the managers of the largest mills in the state. This, together with many other subjects of like importance and value, will come up on the program which ought to prove not only entertaining but of the greatest importance to all concerned. It is the desire of those who have formed this program that the utmost freedom of discussion may prevail. The farmer is invited to give of his experience and to take his place in the various debates that may follow the presentation of addresses and papers. To all in attendance, and especially to those who have come from a distance, we extend a most hearty welcome. We wish you to become acquainted with the work of this institution as well as each other, and to feel that this is your College and that its work is being carried on for your direct interests."

Following this address the Hon. R. C. McCroskey of Garfield was elected chairman and J. H. T. Smith of Pullman secretary of the convention.

The convention then proceeded to take up the prepared program. In the absence of Mr. Lillis F. Smith of Endicott, Mr. M. W. Whitlow of Pullman opened the discussion on methods of wheat production.

METHODS OF WHEAT PRODUCTION.

By MR. M. W. WHITLOW of Pullman.

As to the different kinds of cultivation I have a good deal of work to do and I do not always get it done at the right time. But I believe the proper time to plow is in the spring when the ground is in good condition. Many cultivate in the fall to keep the foul stuff down and keep the ground in good condition. A great many of us do not cultivate any and I do not believe this is the proper way to

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do. I believe the man who cultivates gets better results from keeping the foul stuff down and his grain will come up better. As far as I am personally concerned I depend a good deal on pasturing, but I would not advocate that idea generally. I believe that by cultivating at least twice a man can get better results by plowing his land early.

Mr. Whitlow was asked if he considered it an advantage for a farmer in this locality to keep a large number of stock. He answered—I do not consider it the best, personally, for a man who is raising wheat to keep stock on his ground.

By MR. S. E. CROW of Oakesdale.

Some of our farmers around Oakesdale are finding it profitable to disc their ground and then plow later in the season. They disc it and double disc it and by so doing they cultivate that portion of the soil near the surface, thereby retaining the moisture in the ground. They plow later, say the last of June or the first of July, and by plowing at that season better yields are secured, and little cultivation is required.

GENERAL DISCUSSION.

By MR. W. H. REED of Tacoma.

I might state that I am from Tacoma, but I am experienced in farming around Walla Walla and am in a position to state that the early plowing is decidedly better for light soils, but I do not recommend it for heavy ground that you are trying to avoid packing. Now if you plow the light soil in the fall you have disintegration by frost, which is very valuable to the soil throughout the winter. Thus you have the advantage that your light soil in any district takes in all the winter moisture and does not lose it in the creeks. Therefore in the spring it will retain its moisture a greater length of time. You will see that by harrowing in the spring you will get rid of the weeds and retain the surface moisture which you get in the winter. Thus we have always found that in the dryer soil beneficial results were obtained by plowing in the fall and then harrowing the soil in the spring as soon as possible and after each rain fall, but on the heavier soil and the foot hills we had too much difficulty from packing of the soil when plowed in the fall. I find in my fields that the difference between plowing in the fall and spring of light land sometimes amounted to as much as a gain of five bushels per acre of grain.

SOIL PREPARATION AND CULTIVATION.

By HON. R. C. McCROSKEY of Garfield.

It is related of a French farmer who had two daughters and 40 acres of land that on the marriage of the first daughter he gave her half of his farm, putting the same amount of cultivation on the remaining half he had on the whole, thereby raising as much as the

whole 40 acres had raised, and that on the marriage of the second he divided up with her in like manner, leaving himself only 10 acres on which he bestowed as much labor and tillage as he had in former years on the whole, getting as large a yield as he had gotten on the original tract. What would have been the result if this old gentleman had had three or four more daughters, is left to conjecture.

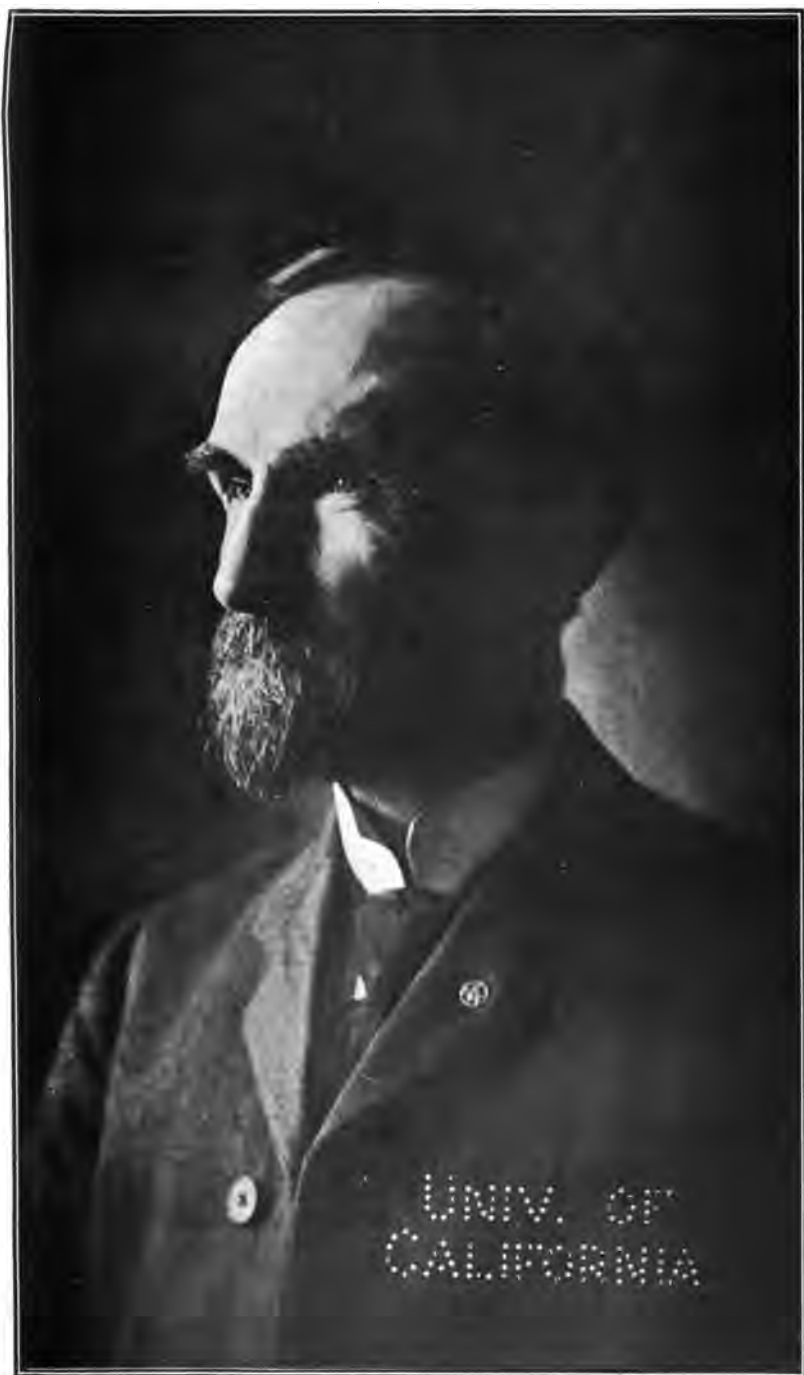
Stirring and mixing the soil is the one fundamental labor of agriculture. How far intensive cultivation may be profitably carried has not to my knowledge been demonstrated. This may have been settled, however, had the Frenchman referred to above raised the regulation family of five or six children, as he should have done. I have experimented along this line somewhat myself, and have not yet reached the limit where the last cultivation did not pay well.

Why tillage should increase fertility is a question that should well occupy the attention of such bodies as ours as well as that of the various experiment stations. But as the facts, rather than the reasons therefor, are the more important for our present purpose I shall not attempt to deal much with the latter.

Cultivation should have three objects. (1) the conservation of moisture, (2) the pulverizing of the soil so it will readily yield plant food and (3) the development of bacterial life which contributes to the fertility and productiveness of the soil.

The most uncertain factor in Eastern Washington in the production of crops is the moisture supply. Our crops are almost always in direct proportion to the rainfall and the manner in which it is distributed throughout the year. The average annual precipitation at the Spokane Signal Service Station is 17.54 inches, which is hardly sufficient unless it is well distributed and this cannot be safely depended on. Therefore the vital question with us, as wheat growers and to which we should address ourselves vigorously, is how to conserve this moisture.

The common and most profitable method so far of doing this is summer fallowing, which seems to meet the two other fundamental requirements mentioned. viz: pulverizing the soil and the development of bacterial life. Plowing land when it is dry neither conserves moisture nor pulverizes it, nor develops bacterial fertility. It is therefore time and labor lost. To fallow land properly it should be either plowed or double disced early in the spring and properly leveled and pulverized with the drag harrow. Nothing, in my opinion, is as good as the plow. This last spring, however, both to try an experiment and to get along faster with my work, I double disced and double harrowed a considerable portion of my land as soon as I got through with putting in the crop. This treatment brought up the wild oats and other weeds in great abundance, which is much to be desired. Five or six weeks later, say in June, it was plowed and double dragged immediately after the plow, the soil being left in a well pulverized and moist condition. To show the value of summer fallowing and thorough cultivation I desire to state that in 1889 a



HON. R. C. McCROSKEY, GARFIELD, PRESIDENT

TO THE
ABSTRACT

tenant raised a crop on a field that was the first land cultivated in the vicinity of Garfield. The crop was so poor that I had to give him my rightful one-third and pay him a certain amount per acre to get him to cut it for hay and take it off. The next spring and summer it was plowed twice and sowed to red chaff wheat in the fall, producing 52 bushels per acre. This same land, which is about an average and has been in cultivation for 25 years, responds to decent treatment as bounteously now as it did then.

I have a neighbor who, in order to get the most possible from his land set apart for summer fallow, pastured it till quite late and then plowed it, there being so little moisture in the ground that it broke up in great clods.

It, and a nearby field that was plowed and harrowed early and otherwise cultivated later, were sowed to wheat about the same time, the former producing but 26 bushels per acre and the latter 42.

I have found nothing on this subject so conclusive as what is given in Bulletin 48 of the North Dakota Experiment Station. (See pages 738 et seq. of said bulletin). The conserving of a part of the moisture of one year to be added to that of the next to produce a crop is not all that is gained by properly cultivating summer fallow, as illustrated in the following experience: On one occasion I raised wheat on two adjacent fields, one of which had been fallowed and the other cropped to wheat the preceding year. The rainfall during the spring and summer was excessive, affording all the moisture needed even on the continuously cropped land. The fallow produced from 40 to 45 bushels and the other land from 25 to 30. I have had several other experiences of a similar kind all pointing in the same direction.

The last crop in Eastern Washington affords a splendid example of well pulverized soil. The long continued freeze of last winter without being followed by beating rains left the soil in the best slacked condition I have ever seen it. Land 25 years under cultivation on which a heavy crop of winter wheat had been raised was plowed in the fall and sowed in the spring, the seeder simply being followed by the drag harrow. It remained so loose and finely pulverized till harvest that a portion of the time the master wheel of the binder would slide. Despite the fact that the rainfall last year was only 66 per cent of the average of the preceding four years and also that the heat in June and July was very excessive, it yielded 28 bushels per acre. The other land in the same section plowed in the spring produced only 21 bushels, owing as I conceive it, to the soil not being so well pulverized. This 21 bushels, however, was a phenomenal yield taking the meager rainfall and excessive heat into consideration. The splendidly slacked and pulverized condition of the soil, in my opinion, saved us from a disastrous failure last year.

I now have an object lesson in what I conceive to be bacterial development that I am watching with considerable interest. Two fields, one just north of the public road and the other south, were

both fallowed. The one south was plowed last fall and not touched again, except by grazing cattle, till in July just before harvest when it was plowed and double harrowed, leaving it well pulverized although quite dry. The north field was double disced and double harrowed in the spring and about six weeks later was plowed 7 inches deep and double drag harrowed immediately after the plow, leaving it in a finely pulverized and moist condition. In the first week of September each field was sown to wheat while the ground was dry. On the 13th of that month, exactly one inch of rain fell wetting the ground north of the road down as far as I prospected, which was $2\frac{1}{2}$ feet. That south of the road, which had been plowed dry, was wet scarcely as deep as it had been plowed. I carefully watched the germination of the grain in each field from day to day and could notice no difference as to its progress. Nor did I notice any difference as to the time it came up. But from that time on the blades of that north of the road appeared to grow wider and thicker and the plant to become more vigorous than that across the road. This difference became more marked from day to day, becoming a matter of remark by casual passers. This difference in the development of the plant is not due to a difference of moisture, for the rainfall in the early part of autumn was excessive. I shall continue to watch this object lesson, carefully note the results and hope to report them to a similar convention at this place next year.

The depth to which land should be plowed depends on the character of the soil. Shallow soil with clay subsoil should not be plowed deep for reasons that are obvious, while land whose subsoil is supplied with plant food should be plowed gradually deeper every three or four years till a depth of $7\frac{1}{2}$ or 8 inches is attained. Afterwards subsoiling every three or four years will be found highly profitable. I cannot more forcibly convey the importance of subsoiling than by calling your attention to what is said on this subject in Bulletin 43 of the Nebraska Experiment Station. (See pages 103 and 104 of said bulletin.)

In conclusion I desire to say: Don't fallow so as to make pasture for your stock. If you do you will be feeding them at a very expensive rate out of your next crop. Summer fallow plowed once and while dry produces little if any better than continuously cropped land. After one good fallowing consisting of plowing early and top cultivating afterwards, two crops can, as a rule, be profitably raised.

There ought to be a law requiring a farmer to plow his summer fallow at the right time and harrow it frequently afterwards.

GENERAL DISCUSSION.

By MR. A. D. THAYER of Waverly.

I have been trying to raise a little wheat, beginning in the fall of 56 in Minnesota. I may say that I have noted with some degree

of apprehension the drift of the conversation this morning. We are assuming that we can continue to raise nothing but wheat, but the time will come when we cannot get any more wheat and I am of the opinion that the time is very close when we will have to diversify our farming in order to keep up our present rate of raising wheat. Now, of course, if we fallow we stimulate our land and make it produce better, but I would prefer to make some use of my land all the time. I live over at Waverly, and we raise some beets over there. We have found that these take the place of the ordinary summer fallow and we get better crops of wheat after beets than after summer fallow. In the first place we plow the land deep and then cultivate thoroughly to keep the weeds down and I think this benefits the land. The spring grain on beet land this year yielded much better than on land which had been summer fallowed. It does not grow so much straw, but we get more grain and it does not fall so badly as where summer fallowed. This might be caused by the difference in the ground or by the beet crop, but in any event we do not get as good crops from the summer fallow. I have only been raising beets for six or seven years, but I have been very much pleased so far as I have gone.

My bluestem wheat this year went 40 bushels, which I think is very good for spring grain. My neighbor, Mr. Walker, got 51 bushels of club and he is a storekeeper and not supposed to be a farmer. I have another neighbor who raised beets two years and got 52 bushels of bluestem. Mr. Fred Kingbaum was the man. I think the time is very close when we must not do so much summer fallowing. I cannot figure out how with \$50 land we can afford to raise two crops out of three.

I take a disc plow and plow deep and then sow to oats early in the spring and get good results, 55 bushels strong. I think if I had plowed the ordinary way I would have got a very light crop. I feel certain that when we grow other crops our land gets better. Our chemist can probably give us some reason for this. I think we get more nitrogen and phosphoric acid in the soil. I raised wheat in Minnesota 20 years ago, but they do not raise so much wheat there now. I think it will be so with us here. We should plant corn on our land and keep some stock.

The first year the factory was built I did not raise beets. Afterwards I thought I would try a few and put in nine acres, which I thought would be about right. This year I raised 100 acres and now I would just as soon raise them as any other crop. I would not be afraid to put in 500 acres if I had the machinery to do it with.

SEEDING.

By MR. J. S. KLEMGARD of Pullman.

Seeding is the easiest part of producing a crop of wheat, especially is this true when the soil has been prepared as suggested by

Mr. McCroskey. Preparing the land and harvesting the crop is the great expense in wheat raising.

With our up-to-date disc drills it is a simple task to place the seed in the ground. Many of us old timers remember when the disc drill was unheard of and broadcast seeders rare. We were compelled to adopt other methods of scattering seed. Many a day have I sat at the rear end of a wagon and thrown the seed with both hands, after which it was scratched in with a peg tooth harrow. It sometimes came up a little streaked but we had good yields. With our up-to-date machinery we simply hitch four or six horses to a drill, set the feed to sow the required amount and at night we have in from fifteen to twenty acres.

As to the time for seeding I will say, sow early. September is the proper time. Many of us have large tracts of land to seed which takes time and may be delayed, but push your seeder along early as it almost always proves to be the best, however, I would say, sow it up to December rather than wait until spring. The amount of seed depends on the variety. Not less than 60 pounds where the berry is small and 90 pounds where large and be sure you get the amount on the ground as some seeders will not sow as much as they indicate. Especially is this true when the grain is damp. Foul ground should have plenty of seed as it has a tendency to keep down the weeds.

My friend says to raise beets to keep down the foul growth as well as to retain the fertility of the soil. This is all very well on small tracts and especially if we adopt the system of dividing up "every time one of our daughters gets married" as stated by Mr. McCroskey, "if we are blessed with daughters enough". I do not believe in the dividing up system, nor do I want my children to be compelled to thin beets, for if there is anything that will drive a child from the farm it is to compel him to pull weeds.

As to the soil becoming exhausted, will say that I heard a gray headed man thirty years ago say that if it was not for the headers leaving the straw on the ground we would at that time have to quit raising wheat, but they are still raising wheat and their land is worth \$100 per acre. This was in the Walla Walla country.

We wheat farmers have been called land robbers and it has been said that the father was robbing the son, but I believe our children's children will be raising wheat here in this Palouse country.

I leased out 320 acres the season of 1904 to be summer fallowed. The land was plowed and pastured with cattle. No cultivation except what the cattle did, which was a very good job but hard on the cows. When the grain was sowed in October it was very cloddy, would almost shake the drill to pieces. It was simply seeded, never harrowed, but we got over 20 sacks of wheat per acre. I mention this simply to show that it is not absolutely necessary to cultivate in all cases to get a good yield.

HARVESTING.

By MR. A. J. STONE of Rosalia.

As has been announced, the harvesting of wheat is the subject before us. This is a subject that has taken my attention, more than any other subject, for the past 20 or 25 years. It is a question that gives us farmers, as a class, a great deal of study, and I feel that it deserves better treatment than I am able to give it. Much as I would like to do so, I do not feel able to propose to you any new plans for harvesting grain, but will confine my remarks to the methods that have been in use in my part of the country for the past 20 years, to trace the gradual development of this system to the present time, and perhaps make some suggestions for improvement, and to meet some new conditions that confront us.

I am well aware that improvements in harvesting and threshing have taken place in the western half of Whitman County that are hardly applicable to our locality, because of climatic conditions. I refer to the combined harvester. This machine I hardly expect to see in common use in the eastern part of the county, as I do not believe that section is well suited to its use. But I have had no experience with combines, and will be greatly interested in the discussion of them that, no doubt, will occur at this meeting.

About 20 years ago binders and headers came in together into common use for harvesting grain. The header took the lead immediately for several reasons. In the first place the binders of that day were a very incomplete and clumsy machine, and the handling of them over the Palouse hills was a very awkward performance. Again the header was a simple machine, was soon brought to a better degree of perfection and it was found much cheaper to harvest grain with this machine. But after some years experience, with early rains and wet falls, it was found that much damage sometimes occurred through bleaching and sprouting, and on several occasions entire crops were a total loss. By the time that costly experience had taught us this much, the binder had been very much improved and was altogether a more serviceable machine. Fall wheat too, had been introduced into the Palouse country and it was found that heading fall wheat was very wasteful. For my part I am using both machines to harvest my grain. I start the binders as early as the grain will possibly bear cutting and continue until the grain is ready for the header. This plan enables me to handle a large crop and to get the work completed before the fall rains begin. By this method I saved almost my entire crop in the disastrous season of 1893. Of course this system would not be applicable to the small farm, for it would be too expensive to maintain two sets of harvesting machinery, and as the aggregate of the grain is grown chiefly on the small farms the needs of the small farmer should be given due consideration in the discussion of this question.

As yet I have been unable to find any machine that will take the place of the binder on the small farm, although it is the most

expensive way of harvesting grain, so much so that when grain is low the expense of harvesting in this way is almost prohibitive. The farmer is now paying more for threshing bundles than the price of wheat in most seasons will justify, and yet the thresherman, with his large gang of incompetent, wasteful help, is unable to make any money, and in fact is now organizing for the purpose of advancing the price of threshing yet higher, so that he can make some money. In addition to the exorbitant price for threshing, the last season has shown us the folly of depending on our professional threshermen to do our threshing. It indeed looks as though the farmer were truly "up against it" and the question with us is, what are we going to do next?

I have thought it might be a good plan in many cases for two, three or four farmers to join together and buy an outfit to do their own threshing. Then as soon as the cutting is completed, whether done by header or binder, a threshing crew can be organized out of the best of the material that has been collected in the several cutting crews who, in connection with the farmers themselves, would make a threshing crew far superior to the gang that ordinarily goes with the threshing machine. Much of the waste that is suffered from the present method of threshing, particularly bundle threshing, is caused by the fact that usually none of the threshing crew is interested in any way in the crop that is being threshed. If the farmers were doing their own threshing, even though at work on their neighbor's and fellow partner's crop, they would be anxious to do him a good job, to avoid waste and to get through with as little expense as possible, so that the partners would reciprocate when coming to the home crop. The waste of the present bundle crews is simply outrageous. Eleven to twelve teams to the crew and not accomplishing what eight wagons could do were the hands interested in the work. In addition all the waste in hauling to the machine and in feeding the stock that could be avoided by careful management. It is often remarked by eastern farmers who observe our way of harvesting that we waste more here than they grow back there.

I am thoroughly convinced that if farmers would join together and do their own threshing, as I have suggested, they would save by the employment of their own teams and themselves and would be spared the sad spectacle of thousands of bushels of the finest grain rotting in the shock, as was seen the present season.

So much for the average farm. For the large farmer it is a waste of time to make any plans for him. The large farmer has got to go. Everybody is crying out against him. He is everywhere regarded as a public nuisance. College professors condemn him, editors attack him, the pulpit bewails his existence and even the Sunday school children are taught that it is easier for a big farmer to get through the eye of a needle than for him to get to heaven. Over in our country they are building electric roads to break him up. Soon the politicians will take hold of him and that will finish him. In-

stead of planning to harvest cheaper he may as well plan to get off the earth. I thank you for your attention.

SOME NEW METHODS OF HARVESTING,

By HON. OSCAR YOUNG of Pullman.

The subject assigned me to discuss at this convention, "The Harvesting of the Grain Crop," is a question that causes the grain producers more uneasiness, anxiety and expense than any other factor pertaining to the business. He can plow, cultivate and seed the ground at a nominal expense with, as a rule, plenty of time to do the work, and at times when it is not difficult to procure sufficient help. We have from six to eight months in which to prepare the ground and seed it, whereas when the harvest comes on the grain must be garnered, particularly in the eastern part of the Palouse country, in from six weeks to two months at the longest. Grain raising, and I mean by that raising wheat, oats and barley, has grown to immense proportions in the northwest and in harvest gives employment to a host of men, thousands of horses and a vast outlay of money for the necessary machinery that the work may be performed in the shortest time possible, in fact, time is the essence of harvesting.

With cutting machinery the country is well supplied, but there is a great dearth of threshers and, as a result, hundreds of acres throughout the Palouse rotted in the shocks this last fall. Owing to the difficulty of obtaining sufficient help and the fickleness and unreliability of a large proportion of the help obtainable, farmers are extremely slow and cautious about investing in costly threshing machinery and as a result the problem of harvesting is becoming more unsatisfactory. Old machinery is worn out and the thresherman does not feel disposed to buy again, particularly in that territory where the combined harvester has entered the field and seems to be giving as much satisfaction. I have been engaged in farming in eastern Washington for the last 30 years. Have used headers and binders and for the last three years have operated a combined harvester, and will candidly tell you that it has given me the most solid satisfaction. Have had no trouble with men quitting me without notice, in fact each year we have come through harvest with the same crew with which we commenced. There is no hard work connected with its operation, five men and 26 horses do the work with a 16-foot cut machine and average about 24 to 25 acres per day. The first two years we were out 25 cents for repairs; last year we had to get a new draper for the header, a few sprocket chains and minor repairs, total expense, \$51. Making the three years run with expenses up to date of \$51.25, and cutting on an average 500 acres per year. I am not talking to the man that thinks binding is the only way to harvest, but to the man that heads his grain. If you head you are compelled to wait until your grain is ripe, and in that case why not

thresh it at the same time? You say you want to save your straw for your stock to winter on. After long years of experience and observation I am convinced that the straw stack is a detriment to the advancement of the Palouse farmer. In the first place where large numbers of horses and cattle are allowed to roam over our stubble fields (I am speaking of the heavy black land of the upper Palouse) when at each step they sink half way to their knees in mud, it is a great injury to the land, causing it to break up in hard clods the following year and the result is that the succeeding crop is not as good as it would have been had the stock been restrained when the soil was in the condition of which I have spoken. Where stock is compelled to winter on straw they lose in flesh all they gain in the preceding summer and when an animal arrives at a mature age it is stunted and never will make the animal it would had it been properly cared for, and seldom does a winter pass but what farmers depending on wintering their cattle in this way do not lose from one to half a dozen head by stacks toppling over on them. The combined harvester will aid in building up a better grade of stock, because no farmer operating one will attempt to winter them on straw. The first year we operated the combined machine we harvested 300 acres of wheat at an actual expense of \$198.82, the same year we hired 40 acres of oats bound, shocked and threshed at a cost of \$187. You will note, however, that in harvesting the 300 acres of wheat the expense was entirely for labor, as we had horses of our own to operate the machine. We find that, basing the price of wheat at 55 cents per bushel, which was about the average last fall, and basing the crop at an average yield of 30 bushels per acre, that by using a harvester and putting the average daily run at 22 acres per day, which is extremely low, that we can harvest a crop at 27½ per cent of the price received for the wheat, against a 42 per cent by using a binder. This is allowing 8 per cent on the investment of \$2000, and \$160 per year for wear of machine and \$50 per year for repairs.

But the farmer who does not raise to exceed 200 acres per year as a rule has not the stock to operate the combined machine, and it is too large an investment. To such I would say join in with your neighbor and together you can handle it, or if you do not take kindly to the harvester, then let two or three neighbors form a partnership and get an outfit that suits your taste and take care of your grain in season, for threshermen are becoming tired of the aggravation and expense of running big outfits in a country where rain is liable to come at any time, and past experience shows that from a financial standpoint very few have succeeded.

ADDRESS BY PRESIDENT E. A. BRYAN.

At 1:30 P. M.

It seems hardly right that, as host on this occasion, I should have been absent at the beginning. I was under engagement to



PRESIDENT E. A. BRYAN
STATE COLLEGE OF WASHINGTON

speaking last night at North Yakima before the State Horticultural Association, and as the distance is too great for me to come over after the adjournment of that meeting, and as it is impossible for me to be in two places at the same time, it was impossible for me to be here to extend the greeting that I should have been so glad to give the members of this convention this morning. It is not too late still, I am sure, to extend a very hearty welcome to you all.

It is a great satisfaction to me that in this convention we have represented not only all of the great grain producing sections of the state, but also all the other grain interests of this great state. There was a time when we did not realize so perfectly as we do now the fact that production does not end until the product is in the hands of the consumer and ready for consumption; and that in addition to the many stages of agricultural production of the grain, the transportation of grain, the milling of grain, and even the baking of the bread, are parts of the process of production. We never consider a commodity a finished product until it is in the hands of the consumer. So that I think the point of view which we should have in all such cases is that we are co-workers together to the same great end. With any finished product that we have, our farmer is apt to say, "I produced it." The transporter as well will say, "I produced it." The miller says, "I produced it;" and the baker will also say, "I produced it." But all jointly produced this finished product. And in the case of the sundry problems which must be solved in order that the best results may be attained, we will do well to recognize this co-operation in production. Looking at it from this point of view, no lack of economy, no lack of efficiency anywhere along the line can fail to affect every interest involved. We are then co-workers who should understand and co-operate, not quarrel and contend.

Throughout the world the production of bread, the staff of life, can by no means be considered unimportant, now or at any time. Of all the productions of humanity this is the most fundamental, the most indispensable. It has taken a long time in the history of cultivation, a very, very long time, to achieve the ends which we have already attained to, for example, wheat, perhaps the best of all the breads of mankind. There was a time, not very far distant in history, when mankind employed less desirable grains, grains of a lower quality in some respects at least, for example—barley, rye, oats, spelts and similar grains. There has been recently, only recently, when considered from the point of view of world history, a great extension in the use of white bread. Rye bread and barley bread have given way before it in continental Europe. Even the oriental people are beginning to use it. This has been due to the profitable and cheap production of wheat. When I refer to the great development of this cereal, wheat, the bread upon which mankind is fed, I recognize the fact that so far as the feeding of mankind is concerned, all of these essential operations in bread production have contributed

their part. Each department of bread production, from the grain to the loaf, has contributed its part. Great progress has been made of course in sowing and reaping, and in threshing and marketing. As a result there has been a vast expansion of the area cultivated. There has been vast improvement of the various tools and implements and machines which do the more work and better work. The product of the crop is less liable to failure. There is more certainty of a larger crop and a better crop.

There have been wonders done in the cheapening of the cost as measured by the labor of man. I am a young man, and yet I remember when the reaping hook was used in remote and new communities and when the grain was bound by hand and threshed by the flail. I can well remember when the cradle was used and was indeed the customary means of reaping grain. I remember when the grain was sown broadcast on illy prepared ground, imperfectly brushed or harrowed in, when little attention was given to the kind or condition of the seed, and when meager yields were the ordinary result. Almost equal progress has been made in milling. The burr mill, with its inefficient wind or water power, its crude methods of separation, seems very remote from the most modern manufacturing of flour and mill products, but it is not remote in point of time.

Any improvement which is made in the production of grain in the milling of it, in the handling of it, and in the transportation of it by land or by water, redounds almost immediately to the benefit of the farming community at the one end, and the consumer at the other. Whatever affects the market for grain here, affects the markets for grain also in the great centers of distribution, and whatever affects the cost of bread in the great centers affects the cost of bread in the remotest corners of the earth, and also affects the cost of all other commodities, for each commodity has value as a substitute or enters in some way or other into the cost of production of other commodities.

I wish to say to you gentlemen, that such a meeting as this, such a subject as this, dealing with hard commercial propositions as it does, may have not only important economic results, but important and widespread sociological results. For every improvement along the line extends itself automatically to the ends of the earth. Every improvement in the economic basis of life in all corners of the globe, resulting therefrom, has a reaction in the improvement of the social welfare, the intellectual and spiritual welfare of mankind, if you please. The farmer, therefore, as he wisely sows and reaps and markets in the best possible way, the transporter and the miller as he does in the best and most economical way his part in the great work of production, each in his way and to his extent is a missionary, working for the betterment of humanity.

The increase in the wheat production of this region has been remarkable. There has recently been a great extension of the area, particularly in our drier lands. I think in 1896, it may have been

in 1895, I spent a few days in the Ritzville country. The farmers were discouraged, there was no increase in the population there, and conditions were such that I said to myself it is a pity that ever an acre of this land was turned over. Part of it at least might grow a little forage for stock. I remember distinctly of talking with a young man who had taken up land there and he said that he taught a country school in the winter in order to get enough money to carry him through the summer. Now all is changed. We have made the discovery since that time that with good cultivation, with proper tillage, with proper methods of seeding, with the selection of the right kind of grain and the proper methods throughout the rest of the year, we could grow good crops on this land. The land has risen in value. Men have grown wealthy in the business. Vast areas which were supposed to be worthless have been turned into smiling wheat fields. Our taxable property has greatly increased. Wealth at home, and the greater supply of foodstuffs abroad, have resulted therefrom.

But while in this and many other points there has been progress, in others there have been no progress. Our methods of seeding and harvesting are by no means perfect. We have neglected absolutely the matter of seed. Scarcely any attempt is made to select the best seed of its kind, or to select pure seed. We are yet at sea in regard to varieties, losing sight of the value of having a few standard varieties. We are losing 8 per cent of our crop through the sack graft. We are still losing a million dollars a year through smut. Only the bounty of nature has made it possible for us to stand up in the face of wasteful and imperfect methods. We have been intensely interested in the cost of railway transportation, and rightly so, for a fair division of the cost of production is necessary, but we have forgotten that transportation includes haulage at this end, and oceanic rates on wheat and flour at the other end.

There is no other industry in the world that is more important than the wheat industry. It has been a matter of surprise to me in view of this fact that the grain producers of the state have not found a certain solidarity of interests, and have not found that it would help them to satisfactorily solve the problems which confront them as individuals—have not altogether tried to settle the problems closely related to their own individual interests. But these and many other problems will receive detailed consideration during this meeting.

I congratulate you that the different interests are together for conference here and now. I welcome you to this College and Experiment Station, whose business it is to contribute to the scientific and practical side to the furtherance of your great work. I commend to your consideration the organization of your forces in a more permanent and harmonious way, and desire to express a readiness to co-operate with you in every good word and work.

This address was followed by a piano solo by Miss Mary Trainer, of Rosalia.

VARIETIES OF WHEAT FOR THE PALOUSE.

By MR. C. B. KEGLEY of Pullman, Master of the State Grange.

In assigning me this subject or topic the management gave plenty of scope, for without considering conditions we would be unable to determine what variety we should advise planting. Then again we must take into consideration the time of planting, your method of harvesting, and in fact many other questions that would not be involved in any other country than this, the greatest wheat producing country on earth, the Palouse country. Here we find a greater variance of climate within a county than could be found in a scope many times greater in the middle west or eastern states, in fact so great a difference that this becomes one of the most important of the many questions involved before we can determine which of the many varieties would be most adapted to planting in your part of the Palouse country.

I will not have time to consider all the questions as they should be, but will confine myself to a few of the many important ones. First and foremost is the condition of soil, and this must be considered in connection with your method of harvesting. I have tried many varieties of both winter and spring wheats and found both by practical experience and observation that more depends on condition of soil than kind planted. The farmer that has given his ground but a single plowing, and left to the stock to keep down weed growth, will find it necessary to solve the problem of which of the varieties will root and take hold of the soil most readily, where the ground has been trampled and there is a shallow seed bed. So far but four varieties of seed would be safe to plant, in the order named. If you harvest with the binder, Red Russian and Forty-fold, equal acreage, as the Forty-fold is at least two weeks earlier it gives time to harvest and get out of the way before the Red Russian comes on; Jones Fife and Club, acreage about one half each, for the same reason as given in the Red Russian and Forty-fold, one being earlier than the other.

On the other hand if you use the combined harvester, then the order is changed, as up to this time the only winter wheat that has proven a success is the Red Russian, therefore the order would be Russian and Club, Russian first, because it will more readily take hold of a solid seed bed, and winter better as a rule on such a prepared bed for planting.

Where proper cultivation has been given the soil we are then confronted with about the same propositions: Which will stand the winter best? Which will make the most rapid growth, thereby keeping down the wild oats and come on for harvest earliest? Which will give on the average the best yield? And how much should be sown to the acre? Let us commence at the latter end of these ques-

tions. Where the seed bed has received the proper cultivation either by harrow, disc or cultivator to keep down the growth of weeds you can safely plant from one-half to three-fourths bushel less per acre and get the same stand.

In other words, if you should plant as much seed on a properly cultivated field as you should plant on a field tramped and rough from dry plowing, you would find you would in all probability have entirely too much stand for the safety of a crop.

If you, by cultivation, have kept your ground clean and free from oats and cockle one bushel has proved sufficient, and I have seen better results from 40 pounds planted to the acre than where a greater amount has been planted.

Of the varieties tried in this part of the country I have found that for rapid growth in the season when the oats are most apt to trouble the plant are the Forty-fold and Red Russian; therefore if you harvest with the binder plant of these two varieties about one-half of your field to each and plant the Forty-fold on the thin ground, planting of both varieties not over fifty pounds to the acre, where your ground is clean, and in no case over 75 pounds to the acre, for if your seed bed is in proper condition this will give all the soil can support. If you think more seed is required to keep down the oat growth, I would advise you to try cultivation, not seed.

Which varieties will give the best yield? This also depends on locality or climatic conditions, and speaking of climatic conditions in a county, would no doubt, to an eastern farmer, sound rather queer, but the conditions are here and we must reckon with them. There are parts of the county where the Red Russian does better than the Forty-fold; especially is this true in that portion of the county north of Garfield, and east of Pullman and Palouse, while the reverse is true in all that portion lying west of those points. Here we find the Forty-fold on the average will give slightly better yield, and at the same time make the most rapid growth and thereby subdue the oats and come on for harvest at least two weeks ahead of the Red Russian.

Thus far the Forty-fold has proven a little more hardy than the Red Russian under similar conditions, yet very little if any complaint have we heard from either, where the planting had been done at the proper time and on properly prepared seed bed. Again, if you harvest with the combined harvester, I would advise that you plant either the Club or Red Russian, as the Forty-fold will shatter badly if left to ripen for the combined.

My reasons for not considering other varieties of wheat are varied and will not permit me taking up but a very few.

In the early days of wheat growing in the Palouse country, when the ground was new and before the roots of the native grasses had decomposed, we had certain varieties of wheats for spring planting which would give splendid results, while today we find the condition changed until we are confined to the Club wheat. Thus it is we

are apprised that we must study something more than varieties. Farming not only requires that you be versed in the practical knowledge of agriculture, but the scientific side as well.

Nor does it stop here. The grower of the foodstuffs of the world should be able to follow his product through all the various stages of manufacture from the raw to the finished product, even the economic distribution of them after being converted into foodstuffs ready for consumption.

DISCUSSION.

Varieties to Plant in the Big Bend Section.

By MR. J. W. FRYE, of Davenport.

I have had more or less experience in wheat growing for many years. I have lived in the Big Bend, Lincoln County, for 20 years or more. We usually seed with the Bluestem variety in our section of the country. It is a much dryer climate than that of the Palouse and I think that Bluestem will grow to better advantage on dry land than other varieties. So if the ground is properly prepared we think the Bluestem is the best variety to grow. We sow from 40 to 50 pounds per acre. Some sow as low as 30 pounds, but that is rather too small an amount. We sow light for the reason that it stools out better, and in our section gives better results. It makes a better yield and is of a better quality of grain.

Varieties to Plant in the Walla Walla Section.

By MR. T. C. ELLIOTT.

I think the Walla Walla country is known as the Bluestem country. The Bluestem is a variety which they like to raise if the season will permit. Perhaps they have not studied it out so intelligently, but they have raised it for 15 years and find that there is always a demand for it. There have been some varieties which they have found difficult to sell. For instance, Fife. In the foothills in the older sections of the country they have found that Bluestem grows too rank and so they raise the club variety and red chaff. It stands up better and the older farmers are giving it the preference. There is a tendency, however, to try Turkey red; during the last year or two there has been some Turkey red shipped in. But Bluestem is chiefly raised. There are other varieties raised but these three are the principal ones we hear about in the Walla Walla country.

METHODS OF IMPROVING VARIETIES.

By C. W. LAWRENCE. Cerealist of the Experiment Station, Pullman.

IMPORTATION

While it is impossible to predict what the importing of foreign varieties may do for the wheat sections of the United States, we know

the results of the past and assume that there are wonderful possibilities for the future. If records are correct—the Fife (better known as Red Fife) which has made the American flour famous the world over—is indirectly of Russian origin. In 1874 a colony from Russian Crimea came to the state of Kansas. Doubtless one or more of you remember that these Mennonites lived for a short time in the city of Topeka. It was these people who brought the variety of wheat which we know today as Turkey. The harvest of 1880 found such an increased acreage that it became a necessity to remodel a mill and use this hard winter wheat instead of the common soft varieties. Since that date farmers have not been compelled to sell this hard wheat at a discount simply because its merits have become known in many wheat producing states.

The Swedish Select Oat in Wisconsin has increased the general yield about one-fifth in localities where its cultivation has become established. This increased income alone amounts to thousands of dollars every year and soon will be multiplied several times. Numerous other examples might be cited in this connection.

HYBRIDIZING

A hybrid is the result of a cross between two varieties. A mongrel is a cross between two plants of the same variety. The person who undertakes such labor must be content to see failures. From over 300 hybrids—the fixed hybrids of hybridizing in 1899—less than 30 show signs of special worth. Many of this number must be discarded for weaknesses which they possess.

Winter Fife, one of Mr. Jones' hybrids, has certainly proven its worth many times in localities where the varieties in use have winter killed numerous years, even so often that it has become unprofitable to sow wheat in the fall.

Hybridizing oats has been quite successful though not one hybrid oat has come to have a commercial value. Experiments seem to be directed toward the securing of a hybrid which is suitable for milling purposes in the manufacture of foods for man.

SELECTION

The last, yet by no means the least important, is the process of selection. Without it no improvement can be made. To accomplish and succeed in even a meager way always requires continual attention which must ever be directed in the same direction.

1st—The individual plant is always considered to be the unit. Its progeny are selected yearly, until the desirable characters are fixed. These must be made without any appreciable loss of former qualities which were characteristic to the variety before selection began. Ex. Minn. No. 169, which is a bluestem, has increased the yield from 8 per cent to 18 per cent where it has been sown throughout the state.

2nd—Also, where the general crop has been injured by frost or rust, the seed may be greatly improved by using that portion of the field which was least affected. The general use of sieves will greatly aid in securing a better grade of seed. By these methods of selection we are able to improve the strain and thereby increase the income by securing a heavier yield.

THE PROBLEM OF GOOD SEED.

By PROF. GEORGE SEVERANCE.

One of the most important factors in the successful production of wheat and other cereals is that of good seed.

As high as five bushels per acre increase in yield has been found by growing a superior strain of a given variety of wheat beside an ordinary strain of the same variety with all conditions, except that of seed, as nearly uniform as possible. Yet with the majority of farmers anything that will germinate well is good seed so long as it is of the variety generally considered best for their locality. If results are becoming unsatisfactory after a few years the farmer may begin to look around for some new variety, perhaps paying a high price for some seed of a much praised new variety to find later that it is no improvement over the home variety and often not as good. As a rule the basis for improvement of the wheats in any locality lies in the use of the best home sorts and the question of improvement or deterioration rests with the farmer himself.

The development of improved strains by careful selection of individual plants having some specific end in view, as has been discussed by Mr. C. W. Lawrence, will usually be left to the man who makes a specialty of plant breeding. The farmer's attention will be given to purity of variety, freedom from foul stuff, control of plant diseases and such selection as may be done with a fanning mill.

Considering the first point we find several advantages in growing a pure variety. Two dissimilar varieties are not likely to ripen evenly. If out when the earliest is ready the other will be too green and the quality of the grain will be impaired. If allowed to stand till all is ripe considerable of the earliest will shatter, causing direct loss. There can be no increased vigor due to cross fertilizing as wheat is self-fertilized. In many places the grade of the wheat is determined in part by its purity. Mixed wheats, containing varieties markedly different in hardness and structure, do not mill as economically as do wheats that are uniform in this regard. Millers practice mixing wheats to produce a uniform grade of flour but they mix wheats of certain quality in definite proportions to obtain a desired result and would prefer not to buy miscellaneous mixtures. Furthermore, if a variety is found that out-yields others or is of superior quality the value of the crop must be directly reduced if any considerable per cent consists of an inferior variety. Farmers should seek to avoid growing a multiplicity of varieties on their farms as the land



PROF. E. E. ELLIOTT, Secy. Ex. Com.

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soon becomes so foul that it is almost impossible to grow pure varieties.

Probably in no locality is fouler wheat grown than in the Palouse, the great pest being the wild oat. This pest is so common that in making up the standard grades the Washington Grain Commission put in a few wild oats for the protection of the Palouse farmers. In other words, number one wheat may contain a certain quantity of wild oats and still grade as number one. However, several buyers have assured me that the man with the clean number one wheat will be given an advantage of as much as two cents per bushel in freedom from dockage, though both lots are given the same grade. The yield perhaps suffers the greatest reduction from the effects of wild oats. Many fields fall short at least one-fourth from their possible yield due to chopping out by this pest. To avoid this difficulty on the Palouse farms in their present condition, two things would be necessary. First, that the soil be thoroughly cultivated the summer preceding the wheat crop, either by clean summer fallow or some cultivated crop as corn, potatoes or sugar beets, and second, that only clean seed be used. The proper care of the summer fallow or hoed crop will get the wild oats practically all germinated out of the seed bed so that with the use of clean seed a crop can be grown that is practically clean. A little more care in this regard would result in a marked increase in revenue for many farmers.

With the exception of the wild oats there is no other one pest that causes such an enormous loss to the Palouse farmer as wheat smut. However, as Professor Beattie will follow with a thorough discussion of this problem, it will be passed in this talk with the suggestion that there be added to the other precautions in securing good seed the careful treatment for smut according to the methods explained by Professor Beattie.

Now as to the method for securing this pure and clean seed I would suggest that a certain portion of the field freest from the wild oats, volunteer wheat, cockle and other foul stuff, so situated as to insure the best matured wheat, and of sufficient size to produce the desired amount of seed, be set apart and all the foul stuff and volunteer wheat be pulled out by hand. Though many farmers maintain that it is impossible to secure clean and pure seed there are very few farms so foul but that sufficient acreage to produce the necessary seed could be selected that could be cleaned at very reasonable cost. It is quite desirable that some portion of the field be selected where the seed will mature fully, as careful experiments have shown that in many cases there is a marked reduction in yield from using immature seed. Careful tests at North Dakota, where conditions often result in a poorly matured lot of wheat, gave the following results: Poorly matured wheat grading No. 3 used for seed, grown beside well matured No. 1 hard, used for seed, yielded as 113 to 194.9.

Aside from the difference that there may be in the actual vitality of the seed the plumper seed will furnish a larger food supply to

the little seedling while it is establishing itself in the soil which in many cases means an advantage that is held till maturity. During such a season as that of 1905 the careful selection of a seed plot where the wheat had thoroughly matured would be very important.

Having selected and thoroughly cleaned the best seed patch possible, care should be taken in threshing that the seed runs clean before any is saved. Last, but not least, comes the careful cleaning with a fanning mill. A careful examination of a small patch of standing grain will show that individual plants vary as much as individual animals in an ordinary herd. Careful investigation has shown that these individual plants transmit their characteristics according to the same laws as do animals. The ideal selection of seed then and the method that is followed by professional plant breeders in securing the most rapid improvement and highest development would consist in selecting individual plants but this would not be practical for the average grower. Close examination of individual plants will show that most of the diseased, weakly, or inferior yielding plants will produce shriveled or small sized grains so that by careful cleaning with a mill the seed of inferior plants will be largely eliminated. Instances are on record of farmers who have maintained the good features of, and even improved standard strains of grain by this method. If this method is practiced a farmer need not be afraid of his variety running out and exchange of seed will be folly. In the greater majority of cases the virtue in exchanging seed lies in the fact that the other fellow has better seed than you have and not in the mere fact that it is shifted from one farm to another.

In conclusion I would earnestly urge every farmer to follow some such plan as outlined above to improve the quality and yield of his grain in addition to improving his methods of tilling and cropping his land.

SMUT AND ITS TREATMENT.

By PROF. R. KENT BEATTIE.

The cause of wheat smut has been known to botanists for a good many years. It is due to the attack of the smut plant which is planted with the seed wheat, germinates in the ground, penetrates the young stem and grows up in the tissues of the straw till heading time. Then it goes into the grain, absorbs the starch which the wheat plant is laying down, and deposits instead of it its own black smut grains, thus making a smut ball instead of a grain of wheat.

Effective methods for the killing of the smut are also well known. They have been used in Europe and the Eastern United States for many years. The problem that faces us is to discover the best way of adapting these treatments to Washington conditions and to our peculiar system of agriculture. It is really a minor problem in farm management. As all know, the smut plant must be killed while it is resting as a smut grain on the grain of wheat. To meet our agricultural conditions a treatment must be secured which may

be applied easily and rapidly to large quantities of grain. The treatment must also kill the smut without injuring the wheat. It must penetrate the crack and the tuft of hairs on the wheat grain and must reach every smut grain.

The vitriol treatment as now used in this region fails to meet these conditions. This is amply proven by the fact that although 90 per cent of the farmers in this region use the method there is a loss of millions of bushels of wheat every year from smut. The vitriol is usually applied by the barrel and sack method. If this is well done every grain of wheat comes in contact with the vitriol solution during the one to five minutes the sack stays in the barrel. The vitriol, however, does not get into the crack of the wheat or into the tuft of hairs during this short soaking. It is impossible to drive the air out of these places by soaking in water in anything less than 20 to 30 minutes. Try it and see. When this vitriolated wheat is planted, if there is a good seed bed and the wheat germinates promptly, the vitriol retards the smut and the wheat gets past the danger stage. But if the farmer plants in "dry dust" the wheat lies in the ground a long while and allows the vitriol to slowly dissolve off, thus removing the danger to smut grains. The vitriol treatment is not effective, because it does not kill all the smut.

The most effective treatment as yet discovered is the formaldehyde treatment. This treatment has driven the smut out of North Dakota, where it was invented. It is effective because the formaldehyde is a gas which rises through the grain and penetrates the cracks and tufts of hairs. If properly applied it thus reaches every smut grain and kills it.

Formaldehyde treated grain may be dried and kept any length of time before sowing. It can be fed without danger to stock. Formaldehyde does not injure grain. In fact it seems to increase the yield of the grain, especially oats.

THE FORMALDEHYDE TREATMENT.

Formaldehyde, Formalin and Formalose are the same thing. Formaldehyde should sell at the drug stores in pound bottles for about 50 cents a pound, and a pound will treat 40 to 50 bushels of grain. If properly used it will kill the smut without injuring the wheat.

HOW TO TREAT THE SEED GRAIN.

Either method is good.

Sprinkling Method—Clean a floor, or a canvas, if smutty, with scalding water; spread out 6 or 8 bushels of grain; sprinkle it with a solution of one pound of Formaldehyde to 45 gallons of water, by means of a spray pump, a sprinkling can or a broom. While sprinkling, shovel vigorously, and see that every grain is wetted. Throw it aside in a pile, and continue until all is treated. Cover pile with wet sacks for two hours.

Trough Method—Set a large watering trough with one end three or four inches higher than the other. At the lower end set a barrel. Put in it one pound of formaldehyde in 45 gallons of water. Pour a half sack of grain into the lower end of the trough. With a small bucket pour a little of the solution on it. Shovel the grain till every bit of it is wet. Then throw it to the upper end of the trough. Repeat till the trough is full. Cover it with wet sacks for two hours.

HOW TO CARE FOR TREATED GRAIN.

Spread it out to dry on a clean, or scalded, floor or canvas; when dry put this clean grain into clean or scalded sacks, and scald out your seeder. Do not smut your clean grain all over again, or your labor is lost. Clean seed produces a clean crop.

Write for information, or tell your troubles to the Washington Agricultural Experiment Station at Pullman, Washington.

HANDLING, STORAGE AND SHIPPING OF GRAIN.

By MR. D. B. PUTMAN of Pullman.

I take it that it is the intention of this convention to discuss these questions in a way calculated to do good, and as I believe this to be in the main, a Farmers Convention, I shall look at it from a farmer's viewpoint, as we are all depending largely on the success of the farmer for our own prosperity.

The handling of grain begins with the harvester in some form, and that form should be adopted generally that will give best results.

One will tell you the combined harvester is the only way. It not only solves the labor question but it is cheaper and better. Another will tell you to head your grain, stack it and in this way you will get best results. But time and experience of nations has shown that the reaper, while not the cheapest method, is yet the best if begun in time. It gathers the foul seeds from the ground, it prevents sun bleaching. It weighs heavier than grain left standing until dead ripe and when cured in the shock it is more desirable for milling.

One of the serious difficulties in the handling of grain is the threshing, or the thresher who does not clean the grain. Speaking from my experience as a farmer, as a thresher of grain (for I have done a great amount of this kind of work) and later as a warehouseman I am heartily of the opinion that all interestes would be best served if the farmers of this country would not employ those threshing machine companies who do not have cleaners attached to their machines.

I have known grain to be delivered to the warehouse having 20 per cent of cockle and wild oats in it. The farmer is thus forced to pay the threshing bill on cockle and other foreign stuff; he also pays for sacks to sack it and he goes to the expense of hauling it to the

warehouse there to be docked out by the warehouseman, and here comes grief to both the farmer and the warehouseman. The farmer has been to extra expense all around. Now one man cuts it out, and I want to say the argument that all warehousemen take it is no argument at all. Who would ask one to write on the warehouse receipt No. One wheat when one-fifth or one-tenth, or any part of it was worthless trash. It is not honest to write anything on a receipt other than the absolute facts.

Now let us say to the thresher. "We must have the grain cleaned when threshed!" And thus avoid unnecessary expense and trouble.

Again we people in the west have argued that it is cheaper to handle grain in bags than in bulk, but recent investigation does not seem to warrant this contention. But even if it were as cheaply done in bags as in bulk, would it not be wise to put the greater part of this sack expense into granaries and boxes, to be kept on the farm, rather than put it into the bag man's pocket?

A short time ago I remarked to a friend "it is cheaper to handle grain in bags in this country than in bulk." He answered "I think not." So I concluded to look into this matter, and I am fully persuaded that if a number of farmers would prepare to handle in bulk they would find it cheaper and better. As to handling grain at the warehouse or elevator, one-half of the crew of men necessary to handle a given amount of grain in bags will handle it in bulk. However there are other expenses in bulk handling that do not follow in handling in bags. As to the matter of warehousing will only say: Your favorites, whoever they may be, will very quickly adjust their houses to the demands of the farmers, whether it be for a sack house or for an elevator. The handling charge and storage are the same in both systems, and I believe those who store their grain and hold for a better price oftener lose than gain by it. They are subject to extra expense in holding and seldom gain materially thereby. I believe the charges made by the various wheat concerns throughout the country for handling and storage of grain are just and fair. I do not know of one who is making an over-charge for this work. Many small concerns have failed on present charges.

Shipping grain is a great question and one that but few understand. It is absolutely necessary to have men in the country to look after the shipments and others at terminals to care for it there. There are many expenses and many risks to take, handling and storage, exchange, insurance, demurrage, wharfage and state inspection. This is a business of itself and should be divorced from the farm.

Now, gentlemen, as there are those here who are to enlarge on the various topics, I will say in conclusion, that if I were now a farmer I would handle my grain first by a reaper, then adopt the threshing and cleaning while threshing, and as soon as possible handle in bulk; this would grade my grain at home and do away with the necessity of a dockage. I would deliver my grain to those paying the

best price. I would sell and if I did not stop interest I would stop expense. In all cases I would advise, never part with your grain until you get a settlement for it. There are too many risks to take in shipping, so I would leave this to those who understand it, and make a business of it. All these expenses come out of the producer, as they are deducted from the price of the grain.

THE ELEVATOR VS. WAREHOUSE SYSTEM.

By MR. S. C. ARMSTRONG of Colfax.

Next in importance to the cultivation of grain comes its successful handling, for upon this almost wholly depends the profit of the crop. Nature, in a way, assists in the crop production, but the farmer must depend upon his own resources for its harvesting, handling and marketing.

To the present time the farmers and grain dealers of the Inland Empire are apparently satisfied with the same methods of handling the grain crop from the threshers to the terminals as they were thirty years ago, while all other methods for caring for crops have been advanced from the primitive cradle and the chaff piled to the combined harvester.

Now that all other branches of agricultural facilities have been brought to a point where they are well within the march of civilization, enough time is found to go back thirty years and pick up the OLD method of handling our chief product with the view of bringing it to the place it belongs.

In discussing this subject fully it is necessary to go into the details of two methods of caring for grain, more particularly wheat; one is handling it in bulk; and the other in sacks.

The treatment of the two methods or systems necessitates going through each process from the harvest field to the ship, or better to the mill, where the wheat loses its identity.

Our system of wheat handling is so common to those in touch with the wheat producing section of the west that it needs no explanation; nearly any man engaged in wheat raising can tell at once the price of grain bags; the price of twine to sew them; the use of grain bags; that they are thrown upon the ground in ricks and left there uncovered after they are filled; that rain often comes and damages their contents by causing it to grow or become musty; that stock break into the field and tear the sacks and waste great quantities of grain; that count often comes out short of what the threshing machine man has charged; that men and teams must be hired at high wages to haul the wheat to the warehouse before more bad weather comes; that quantities of grain is lost from leakage from one cause or another in transit to the warehouse; that it requires at least thirty minutes on an average to unload each 100 sacks from the wagon; that it must be piled high in the warehouse by expensive labor; that sacks are again roughly dealt with and great loss occas-

ioned by great weight upon the lower layers, and ravages by mice; that all this has to be torn down and loaded into cars by expensive labor; that loss is again sustained by leakage by badly damaged sacks; that freight amounting to a considerable amount must be paid on the sacks to the terminal; that another loss must be sustained in unloading still worse damaged sacks; that the greater part of the sacks must be emptied and resacked again in order to get a uniform grade of grain before it goes to the ship; that it is an expensive operation to stow away and take from a ship's hold a load of sacked wheat, and last but not least, they can tell who pays for it all.

For the sake of discussion it is only necessary to explain that in going from our present warehouse method to the elevator system the course of procedure would be to provide bins, portable or otherwise, upon the farms to receive the wheat from the thresher; fill them by inexpensive machinery; have the product of the farm securely housed, and free from all damage by reason of wet weather, or from loss by reason of leaky sacks or breechy stock; load it into tanks on wagons by machinery; and haul it to the dealer sold to, who handles it by machinery, avoiding the heavy cost and the usual loss of handling in sacks. The dealer in turn loads cars by machinery and they are unloaded by machinery at the terminal elevator or mill, and if the grain must go on shipboard in bags, all waste from decay, rot-tage, usual wear and tear and freight to and from the terminals, can be saved by using new sacks to resack at the terminal.

With the comparisons to be drawn between the two systems it seems nothing less than an astonishing fact that present methods of caring for and marketing the grain product would be persisted in when it is so clearly evident to both farmer and grain dealer that it is so far behind the elevator system in every respect.

The warehouse system is so thoroughly established now that it would not be possible to make the change at once. In any event the producer must bring about the change, as the dealer has already demonstrated that it is not within his power to do so, and no one is going to try it again until the producer guarantees its success.

Comparison of the two systems by way of dollars and cents and resorting to actual figures we find that farmers of the State of Washington expended \$1,120,000.00 for jute bags enough to sack the wheat grown this season, and no less than one-fourth of this amount, or \$280,000.00 went for the sake of a facility for delivering the year's crop; enough to purchase lumber to construct 11,700 one thousand bushels capacity bins on the farms of this state, which is sufficient to hold more than one-third of the entire crop.

Figuring a waste of only one pound per sack for leakage and waste while still on the farm from stock breaking into the field, moisture from contact with the ground, and rain before it is hauled, and from sacks being torn loading and unloading, and from faulty sewing while being delivered to warehouses, this loss foots up to

275,000 bushels and allowing 50 cents per bushel for this, the amount representing absolute loss is \$137,500.00.

Taking this in connection with the amount paid for use of bags, or that in excess of what is received for them when sold with wheat, the sum of \$317,500 goes out of the profits of wheat raising each year in this state alone. Going back to the thresher, the expense of sacking over that of elevating the grain into bins, will at a low estimate reach \$10.00 per day for each thresher, not counting the lost grain around the sacker, which usually amounts to from 5 to 25 bushels for each setting, and figuring 1500 sacks per day for a day's work, makes the extra expense at the machine 2-3 of one cent per sack, or \$10,000.00 per annum on the state's crop. Summing up the entire cost of using bags for grain over that of caring for it in bulk, the excess amounts to \$427,500.00 for each crop, or nearly enough to purchase lumber to build bins for it; thus it is that farmers of the state of Washington are each year practically throwing away enough money directly to house their whole crop; all for the sake of holding to an old method of taking care of their wheat product. Indirectly figuring upon the presumption that warehouse charges would be the same for bulk grain as they are for sacked grain, the farmer is paying fully one-half of the storage charge after January 1st more than he would pay if he binned his wheat on the farm and delivered it as it is sold, and figuring one-fourth of the crop remaining in the warehouses for three months after January 1st, and dividing this in half, for the excess farmers pay each year voluntarily, the amount will reach the sum of \$37,125.00, and to this add interest paid on purchase price of bags each year which is very conservative at 30 cents per 1000 bags, or \$4,950.00; and to this the cost of twine at \$2.00 per 1000 bags which is no less than \$33,000.00 and to this again add the small profit of one per cent upon the investment for the amount of money required to provide warehouse room for the storage of ALL the crop at harvest time against the amount that would be necessary to provide room for the crop were it delivered as sold, and we can figure no less than \$94.20 for this item; making the total of the indirect expense for handling sacked grain over handling bulk against the crop amount to \$59,545.00 each year.

Summing the direct and indirect expense the grand total of \$487,045.00 is given as the amount paid each year for the privilege OF SACKING Washington's wheat crop. The only arguments against handling bulk grain and storing on the farms until it is ready for market are that threshers are not prepared to take care of bulk wheat and roads are not in condition to deliver at any time of the year. As for the machines being equipped for the work, that matter will adjust itself as soon as the farmer brings a bin or a tank to each setting in the field and demands the wheat to be thrown into it; and his threshing bill will soon after be reduced at least 1 cent per bushel in consequence of it. The road question has agitated the minds of



WORKING SUMMER-FALLOW WITH DISC HARROW



the citizens of the wheat producing part of the state for several years and the great barrier to the solution has been funds with which to do the work. The road EXPERT will no doubt demonstrate what can be done in the way of making roads with a given amount of money during this session; if so, compare it with the amount saved by handling your wheat in bulk and see how long it would take to put every road within the farming section of the state in such condition that grain might be marketed at any time of the year.

These advantages are only such as can be measured by dollars and cents and do not include any that might be taken up from a grain dealer's standpoint that would also diminish the cost of handling materially before it is finally stowed away in the ship, and this in course of time, would find its way back to the producer. Uniformity of grade is an important factor in placing our wheat on an equality with the product of other sections in the markets of the world, and this can never be attained with the present sacking method.

There have been many objections raised against the use of elevators and bulk wheat, but there are none that may not be easily overcome, and any expense attached to the change will soon be covered by the advantage gained by their use. Bulking wheat from a combined machine might be termed the most objectional feature but this can be overcome in several different ways—it might be sacked as at present and picked up and emptied into bins placed within easy reach with one or two teams, or it might be elevated into wagons from the machine as from a header and taken care of in this way with very little extra expense, and the waste and loss in weight occasioned by throwing the sacks upon the ground will more than off-set it. Bins can be constructed of wood or iron and made portable so they can be placed in the most convenient places to be filled from the threshers by elevator to which may be attached automatic scales and as soon as the threshing is done the exact amount of grain in each bin will be had, or, if no scale is used, the amount of each bin may be obtained within a few pounds by measurement. Suitable tanks may be made to hold a two, four, six or eight horse load, and by means of several different types of traps, can be unloaded at the elevator in from one-fourth to one-tenth of the time necessary to unload the same amount of sacked grain at a warehouse. These tanks can be loaded from the bins with scoops or other more convenient methods; but even if the scoop is used, it will require little, if any more, time than to load the same amount in sacks. The matter of insurance is also worthy of consideration. Whether grain stored in the warehouse is insured or not, the element of risk is the same and should be entered up as cost against the sack method. While the grain is in bins in the field the stubble may be scraped from around them for a few feet and the risk of fire is reduced to the minimum. Summing up the advantages and disadvantages of the elevator as compared with the warehouse, not already enumerated, and making liberal allowance for all the

disadvantages and objectionable features of the elevator system, the farmers of the State of Washington will each year be one-half million dollars better off and the elevator the benefactor.

HANDLING IN BULK.

This subject had been assigned to MR. W. H. RICHARDSON of Dayton, who was unable to be present, but sent the following letter:

Dayton, Wash., Nov. 28, 1905.

Professor E. E. Elliott,

Dear Sir:

Your favor of recent date at hand and noted. I have not made a special study of shipping grain in bulk and do not know what the possibilities for shipping in that way from this coast are, but have always understood that it was necessary to sack owing to the time on water. As to the truth of this I do not know.

However, I believe that farmers can make quite a saving by stowing in bulk in the fields till sold even if they may have to sack afterwards. I have adopted a system of stowing into tanks located in the fields at the settings into which the grain is run direct from the thresher by pneumatic elevator. The plan is original with me and I think it such a success that I think it the only way to handle grain.

While I cannot discuss the advantage of shipping in bulk before your convention I hope to attend and will be glad to give any information on my system of stowing and handling grain.

Yours truly,

W. H. Richardson.

DISCUSSION.

By MR. ALONZO WARDALL of Spokane.

In the state of Kansas the farmers would not stand for handling grain in sacks. I believe it costs two cents more per bushel to handle grain in sacks, than loose, even if the sacks were given you. It is absolutely unnecessary. As Horace Greeley said, "The way to stop it is to stop it." There is a big meeting called for to-morrow at Ritzville to devise ways and means to stop handling grain in sacks. A warehouse man at Ritzville says there is no difference in the price they get for wheat in sacks or bulk. He also said that it costs less to handle it. Farmers are commencing to handle grain loose, and I urge the farmers and shippers throughout the state to join hands to help me bring about the time when we can handle grain in bulk. It only takes two men to handle it in bulk where it takes ten to handle it in sacks. The saving in sacks on our farms for two years would about pay for the tanks to handle it in bulk.

Question by Professor Elliott.

Several members of the convention today have asked whether the wheat must necessarily be sacked before it is shipped around the Horn:

Mr. Bibb of Tacoma Answers as Follows:

It is not necessary for wheat to be sacked to ship it around the Horn. I myself, and this gentleman by my side, have belonged to a company which successfully shipped seven cargoes of wheat to Liverpool in bulk. It is merely a matter of putting in the proper bulkheads and arranging the ship for the purpose. And this can be done at a very low cost. The great difficulty of getting rid of the sacks lies in the fact that bulk grain when handled in elevators becomes black with smut. The elevators smash up the smut balls, distribute the smut all through the wheat and blacken the hairs on the end of the wheat grain, which Prof. Beattie told you about this morning. This puts the wheat in such a condition that when it gets to Liverpool it is graded down to almost nothing. Gentlemen you cannot get rid of the sacks until you get rid of the smut. I consider this smut problem the most important subject before this wheat convention. If you want to stop using sacks quit raising smut.

ECONOMIC VALUE OF GOOD ROADS TO
WHEAT RAISERS.

By Professor W. J. ROBERTS of State College.

Every paper and address presented to this convention has been crowded with suggestions for improved methods in producing, transporting and marketing our great cereal crop. Choice of seed, kind of farm machinery to use, elimination of smut, handling in bulk, storage, milling and transportation, each and every problem calls for an economic consideration of results. Some of the problems have two solutions, either of which gives satisfactory results, other problems, such as elimination of smut, seem to have but one satisfactory solution. But what must have appealed to every member of this convention was the fact that each speaker's pet problem, when solved by his particular method, was of greatest economic importance.

I, too, have a "hobby," and my horse is of the same breed as other horses rode in this convention. His name is "Economy."

The artist's handiwork is set forth upon canvas according to his conception of size, form and color. Many of us are color blind; some of us do not know what "good form" is; but all of us can see a thing if it is big enough.

I sometimes stimulate a class of students with this easy but large problem: In 1896, when the campaign issue was "Free Silver Coinage," it was asserted that all the gold in the world used for coinage purposes would make a cube of gold only 22 feet on a side, that

is a block of gold smaller than this assembly room. Now had \$1.00 been placed at 6 per cent compound interest, 1905 years ago, at the beginning of the christian era, the present worth would be: \$1,-642, 000, 000, 000, 000,000,000,000,000,000,000,000,000,000,-000.00, which converted into spheres of solid gold without alloy, would make 13,940,000,000,000,000,000,000,000,000,000,000 globes as large as the earth! A large result from only a small factor—only six per cent. Hence the small factor given time enough will become great.

A treatise on "Roads and Pavements" (Baker) recently issued gives twelve principal advantages accruing from the construction of Good Roads:

ADVANTAGES.

1. Good roads decrease cost of transportation.
2. Good roads permit the cultivation of crops not otherwise marketable.
3. Good roads give a wider choice of time for the marketing of crops.
4. Good roads permit the marketing to be done when the prices are most favorable.
5. Good roads give a wider choice of market (this affects perishable products chiefly.)
6. Good roads tend to equalize the produce market between different climatic conditions.
7. Good roads tend to equalize R. R. traffic between different seasons of the year.
8. Good roads tend to equalize mercantile business between the seasons.
9. Good roads permit more easy intercourse between the members of a rural community. This is an important benefit in a republican form of government.
10. Good roads facilitate the consolidation of rural schools and thereby increase their economy and efficiency.
11. Good roads facilitate rural mail delivery and thereby tend to improve our social and intellectual conditions.
12. Good roads sometimes change rural into suburban property and often induce tourist travel.

Eight of these twelve advantages of good roads relate to financial benefits of hard roads and four to the social benefits.

Because this is a wheat convention, dealing chiefly with the economics of the wheat industry, shall we forget the social and intellectual advantages accruing from good roads? Good roads are desirable for the same reason that a man builds a fine house or buys a carriage—because they give comfort and pleasure. They are desired for the same reason that good schools are maintained—because they increase the intelligence and value of the citizen to society.

COST OF WAGON TRANSPORTATION.

The chief financial advantage of hard roads—good roads—is the decreased cost of transportation.

Let us examine the proportion of this cost that may be saved by road improvement. A little figuring with a few warehouse men in this vicinity shows that the average haul from farm to warehouse for the warehouses near Pullman is between five and six miles. Where warehouses are more widely dispersed, as in the western portion of this county, in parts of the Big Bend, and Horse Heaven country, twelve miles is nearer the average, and doubtless six to seven miles would represent fairly the average distance wheat is hauled in this state. The common price for hauling is one cent per sack per mile. If the sack weighs 130 pounds and the distance hauled on the average is six miles then the cost per bushel for hauling from farm to warehouse is $2\frac{3}{4}$ cents per bushel. We export 25,000,000 bushels annually from Washington, the cost of hauling from farm to warehouse being \$688,000. Can any portion of this be saved, and if so how much and in what way?

There are three important ways in which a road can be improved so as to reduce the cost of transportation.

1st—By reducing the distance if this can be done without increasing the gradients.

2nd—By reducing the gradients where this can be done without increasing the distance, and sometimes even at the expense of increased distance.

3rd—By improved surfacing to reduce the tractive effort.

The first improvement appeals to the man in a hurry; the second to the teamster with a heavy load, but the third improvement has greater value than both the first and second combined.

As to the first, it is no exaggeration to say that the 3000 miles of road in Whitman County could be shortened one-tenth by better location without increasing the gradients. Here is an efficiency of only 90 per cent on account of mistakes in location.

As to the second, and taking the roads around Pullman as a fair average of the roads of the county, it is well within a conservative estimate to say that the maximum gradients could be reduced from 10 per cent to 5 per cent without increasing their length. According to our best authorities, the reduction of our maximum gradients from 10 to 5 per cent would give a team a hauling capacity 1.58 times greater. Here is an efficiency of only 63 per cent on account of mistakes in location.

In regard to the third improvement, authorities give the relative hauling capacity on a good Macadam road at least two times greater than on the best hard dry earth road, and four to ten times as great as on earth roads when soft and muddy. Here is an efficiency of 50 per cent or less.

Combining the three efficiencies: .90x.63x.50—.28, and I think any sane wheat raiser that found he was getting only 28 per cent of the results he ought to get from his labor and capital invested, would look for a remedy. Here is 72 per cent of the cost of the wheat hauling, .72x\$688,000—\$495,000 annually to be saved by the suggested improvements. Capitalize this sum (these mistakes) at 4 per cent giving \$12 375,000 and you have something worthy the attention of a "Captain of Industry."

At this point in the proceedings Mr. O. B. Kegley obtained the floor and introduced the following resolution, which on motion was adopted:

"Whereas, the two past sessions of the legislature have failed to make purchases of additional land for the State Experiment Station and,

"Whereas, additional land is necessary for the successful work of the Station, therefore, be it

"Resolved, That it is the sense of the Wheat Convention of Washington, here in session, that the next legislature shall appropriate money for additional farm lands, not less than 240 acres, for the Experiment Station and that we urge upon all friends of agriculture in the legislature the importance of this appropriation."

The following resolution was also introduced by Mr. Kegley, on motion adopted and wired to the Senators and Representatives in Congress of the state of Washington:

"Resolved, That the Wheat Convention of Washington, assembled at Pullman, January 11 and 12, 1906, endorse House Bill No. 345 by Mr. Adams of Wisconsin, making increased appropriations to the agricultural experiment stations in the several states, and urge upon our congressional delegation the importance of its passage at the present session of congress."

On motion adjournment was taken until 7:30 p. m.

Preceding the evening session, the Convention was favored by a band concert given by the Cadet Band of the State College, led by Prof. W. B. Strong, which was highly appreciated by those in attendance.

By request, Mr. F. F. Nalder read the following paper:

THE SHIPPING OF WHEAT.

By MR. JOSEPH W. McCABE of Walla Walla.

WASHINGTON & COLUMBIA RIVER RAILWAY CO.
Office of Vice Pres't and Gen'l Manager.

Walla Walla, Washington, Dec. 13, 1905.

Prof. E. E. Elliott, State College of Washington,
Pullman Washington.

My Dear Sir:—I beg to wait on you with a response to your valued favor of November 27th. My absence from the state during the second week in January 1906, will preclude my being present at the Convention to be held at Pullman. I have taken advantage of the opportunity afforded me to submit the following:

In considering the manifold questions which are embraced in the topic, "Shipping of Wheat," you have so kindly assigned me, let me premise by saying that in order to properly consider them you should have allowed me the space that a bulky volume would occupy, instead that of "a talk or paper," because "Shipping of Wheat" includes all of the operations necessary to convey the grain from the spout of the threshing machine to the table of the consumer. Neither knowledge or time prompts me to undertake the task; I can only speak generally of some of these operations. And while, during a busy life employed in the practical solution of some of the operations in connection with the "Shipping of Wheat," I have learned some of them fairly well; there are many others about which my knowledge is hardly theoretical.

Let me, briefly, then, try to impart some of the lessons experience has taught me and present to you some of the theories observation and study have lodged in my mind.

To begin at the spout of the thresher: I believe none of the many varieties of threshing machines have been so constructed that it is possible to deliver grain therefrom direct into a tight wagon bed, much less into a warehouse. It is therefore necessary to use sacks in shipping wheat. Whether it be more profitable to put grain in grain bags, made of jute, with which all here are familiar, sew them up and ship the wheat in them to market, no matter in what part of the world located, or spout the wheat into heavy seamless bags, tie them up, and empty them at the elevator, the grain to be thence loaded through an elevator spout into tight cars and sent to market in bulk, is a broad and unsolved question. It does not matter, however, whether the wheat seeks market sacked or in bulk, the first problem to solve is the road to shipping station.

At present, it costs two cents a sack per mile to haul wheat from the farm to the station. Can that cost be reduced? "It can,"

comes the ready answer of theory and experience. "How?" inquires the wheat grower. The simple answer is by building good roads. When it is possible for a team to haul twice as much as it does today, the cost of hauling to the railroad shipping point will be reduced nearly fifty per cent. If all the 35,000,000 bushels of wheat raised in Washington were hauled to market, and none of it kept on the farms for seed and other purposes, the outlay for hauling would be \$350,000.00 provided it was hauled only two miles. But as the vast bulk of it is hauled several miles, suppose we make the average haul five miles, it may be more or less, the cost of hauling would be two and one-half cents a bushel, or a grand total of \$875,000.00.

If the present roads were made so a team could double its loads without exerting more power than it now employs, the same amount of grain could be hauled the same average distance for, say three-fifths of the present cost, or a clear saving of \$525,000.00. Is that sum worth saving? Then do all in your power to promote the construction of good roads from the threshing machine to the point of transfer to Rail. Possibly you know that railroad companies keep engineers constantly studying how to improve the road bed, and are spending vast sums each year in reducing grades, straightening curves, building better bridges and generally improving the road bed and rolling stock. Why should not the grain raisers follow the example of the railroad companies and improve their roads?

In this connection, allow me to give you a hint. It has been demonstrated in the Walla Walla country that a team can haul twice as much over the ordinary dirt roads of that region, if the road is first well strawed. It seems to me that while the farmers are waiting the slow processes of legislation and taxation to prepare good roads, that they can largely decrease the cost of shipping their wheat to market by each man putting straw on the road past his acres.

Not many years ago, the surplus wheat of the Pacific Northwest was forced to seek a market in Europe, a condition that made a long, dangerous journey around Cape Horn, through two tropic and one arctic climate, necessary. Shipmasters and owners declared that the dangers of the voyage around Cape Horn were so greatly increased by the tendency of the loose grain to shift, particularly in the tremendous waves encountered off the Horn, that it was impossible to ship wheat in bulk to Europe and, therefore, it had to be shipped in sacks. I don't know whether the attempt was ever made to ship wheat in bulk around Cape Horn, but I do know that many millions of bushels have been sent to Europe over that route in sacks. Because of the refusal of ship masters and owners to carry wheat from Pacific ports to Europe in bulk, the farmers of the Pacific coast have acquired the sack habit, a habit that costs them millions of dollars each year.

To sack the 35,000,000 bushels of wheat threshed in Washington this year, cost an average of four cents a bushel or the large sum



HARVESTING WITH COMBINED HARVESTER IN THE PALOUSE

of \$1,400,000.00. Not one cent of this outlay does the farmer receive back when he sells his wheat. The buyer purchases the wheat and makes no allowance for them, but does allow the farmer to pay railroad charges on his sacks. Unless the farmer can induce a grain buyer to furnish sacks he must either buy them for cash or on credit. The grain buyer regards the sacks containing the wheat as the buyer of canned salmon regards the tin cans in which it is preserved, or as the farmer does the paper in which the merchant wraps his purchases, as a necessary part of the transaction; the cost of which, the salmon canner or the merchant must stand.

It goes without saying that the only way to eliminate the cost of Calcutta sacks is to ship wheat in bulk. Of course, to do even this, a small number of heavy, seamless sacks must form part of the equipment of every wheat raiser, because they will be absolutely necessary in order for him to be able to haul his wheat to the warehouse. But this would not be an annual outlay, as these heavy sacks, if properly cared for, will do for the haul of many crops from the thresher to the warehouse. Then, too, by the substitution of the bulk for the sacked system of shipping wheat, the expense of passing through the warehouse to cars, and from cars to the elevators would be greatly reduced. When wheat is shipped in sacks, it takes three men one-half day to load a car, whereas, in bulk shipment, one man operates a chute and the car is loaded in a few minutes. At the terminal of railroad haul, the same conditions prevail. And so, of loading a ship. Now an electric apparatus and several men are required for days to handle, move and store the sacks; while in bulk shipment a man to tend the gate of the chute and one or two to direct the stream of grain, can, and do, load a ship in a few hours.

How can the bulk shipment be put in operation in the Inland Empire, is a question which has not yet been solved. It is certain that last year several millions of bushels of wheat were shipped in bulk, by rail to St. Paul, Chicago and other Eastern markets. But that is a condition which occurs infrequently; when it does, the grain buyer makes an additional profit in the shape of second hand sacks, when he buys sacked grain and ships bulk grain.

It is a matter of common knowledge that grain is shipped in bulk from New York, and other Atlantic Ports, to Europe, and that it is done safely and profitably. Possibly, when the uncounted millions in the Orient make wheat products a part of their daily diet, ship owners will take bulk wheat in bulk to them. It would seem that if it is possible to safely ship grain in bulk across the Atlantic it would be safe and profitable to ship wheat in bulk across the Pacific. When the great bulk of the wheat grown in the Inland Empire seeks market in the Orient, it is very probable that the farmers who raise the grain will be relieved of the necessity of buying grain sacks.

In this connection, let me register the opinion that it is an imposition on the vast majority of the grain raisers of Washington, to say nothing of other taxpayers, to force them to pay taxes to conduct

the penitentiary jute mill in the interest of the few who are able, because of proximity, to buy penitentiary grain bags. Last year, fully fifteen million sacks were used by the wheat growers of Washington, less than a million of them being the product of the penitentiary jute mill.

Warehouse charges form a good share of the cost of "Shipping Wheat." It now costs a cent and a half a bushel to ship grain through a warehouse. I do not say that the charge is excessive, but I am very positive that if the wheat were shipped in bulk, the charge would be less, as the cost of handling bulk wheat is much less than the cost of handling sacked wheat. The railroads would welcome, for many reasons, the change from the sack to the bulk system of shipping grain.

It would seem from the foregoing review of conditions, that the two most important things to be done to reduce the cost of shipping grain are the construction of good roads and the substitution of the bulk for the sack system.

The first is within the power of the grain growers; and it gives me pleasure, as a Railroad Manager, to assure you that the railroads are doing all in their power to promote the construction of good roads. Experience has taught railroad managers that the best obtainable roadbed is the safest and most productive. Knowing this, they believe that good wagon roads will add to the business of the best railroad.

The other needed thing; the substitution of the bulk for the sack system of shipment, is a problem that requires time and experiment to solve. As the railroads are as much interested as the farmers their traffic men are engaged in attempting its solution. In determining the charge, the freight rate on grain, as well as the rates on all other freights, many things have to be taken into consideration by the traffic department. To enumerate and elucidate them, would extend this paper into a good sized book.

Generally speaking, a railroad between two given points is constructed on the shortest and most practicable route. When the main line is constructed, switches and side tracks are built where, in the judgment of the engineers and patrons, they are deemed necessary. After the road is in operation there is a constant demand for new switches and side tracks for the accommodation of shippers. A side track or switch costs more to construct than does the same length of main track, because the switches are expensive pieces of machinery and require more careful examination and care by track men. In operating a railroad, eternal vigilance is the price of safety. Every mile of track, and particularly every switch, is carefully examined, at least once a day. It follows, therefore, that every siding put in, increases the danger and the labor of operating a railroad. You have doubtless read of the "spiking down of the switches" on the occasion of the record run between Chicago and New York, and from that incident can gain an idea of the dangers flowing from frequent

side tracks. It is this constant danger, more than the cost of building switches and side tracks, which compels railroad officials to limit their number. Of course the absence of a siding on the farm of every man through whose track the railroad runs, increases the cost of getting that farmer's grain to market, in proportion to the increase in the distance of his team haul. No way of overcoming this increase of cost of hauling to market, to the individual farmer, has ever been devised. I assure you that switches and side tracks are always located so as to promote the greatest good of the greatest number.

In this connection, you should remember that the majority of side tracks and switches, put in for the convenience of the farmers, are idle the greater portion of the year, but that the interest on their cost, and the expense of their constant inspection and repair goes on just as they would, were they in use every day. The annual interest on cost of road and the cost of their examination and repair, are factors a traffic man must consider when establishing his freight tariffs.

You will please pardon me, however, for calling attention to a little peculiarity of the farmer. He will, if he lives ten miles from a railroad station, go on, year after year, paying to haul his grain to the railroad warehouse and do so without an attempt to improve the road his grain is hauled over by team, and at the same time devote considerable time and temper in denouncing the railroad, which charges him a less sum for hauling his grain four hundred miles than it costs him to haul it ten miles.

There is but one feature in connection with the handling of grain that needs attention; present methods are satisfactory so far as caring for grain from the time it is threshed till delivered to consumer; except so far as the question of expense enters into it. Can this expense be reduced? How much, and by what method? So far as railways are involved in the hauling of grain, the question of reduction of their rate is alone to be treated. I believe it is generally admitted that their part of the movement is handled satisfactorily; except that perhaps it should be done at lower rate. This feature is now being treated by the wisest and most skilled representatives of the State and Railways and will no doubt yield results. There is much to be done in reducing the expense of hauling grain, that the business of raising it, may be profitable. The exhibit which I have made, may deserve some attention.

Yours Respectfully,
Joseph McCabe.

The convention then listened to the following address:

THE RELATION THAT SHOULD EXIST BETWEEN COMMON CARRIERS AND AGRICULTURAL PRODUCERS.

By JUDGE B. S. GROSSCUP, of the Northern Pacific Railroad, Tacoma.

Substantially twenty per cent of the tonnage of the railroads serving this section of the country known on the northwest coast as the "Inland Empire" consists of the products of the farm. Nearly the same percentage of the money received by the farmer for these products is paid to the railways for transportation to the seaboard markets. The prosperity of the farmer and the carrier is dependent one upon the other, and dependent in practically the same proportion. Any influence which will raise or lower the tonnage produced and marketed adds to or cuts down the revenues of the carrier. Any influence which will raise or lower the price of transportation will add to or cut down the profits of the farmer. The volume of tonnage produced by the farmer influences the cost of transportation and consequent profits derived from carrying on the business.

Manifestly, to stimulate tonnage is the first consideration of the railroad traffic manager. Unless the farmer is prosperous he will not increase the acreage of his crops and will not go to the expense of handling his soil so as to produce the maximum crop per acre. The farmer has for his ultimate object the realization of the largest amount of net revenue from his investment and labor. If the margin over the bare cost of labor is narrow he will seek to produce as many bushels as possible with the smallest expense for labor, sacrificing acreage and care in culture, to margin between labor account and income. This is one extreme and it is almost always the companion of low prices of products. The opposite extreme accompanying high prices is large acreage and intensified culture resulting in a higher proportionate cost per bushel but by reason of an increased number of bushels more net money is the result. Then there are the various intermediate conditions which only a judicious farmer with large experience is able to meet to the best advantage.

Selling price, cost of production, and volume of production are the three factors which enter into the intelligent business management of the farm. The moving either up or down of one of these elements moves the other two either up or down. If the selling price of produce goes down, the farmer will either cut the cost of production or increase the volume of his produce or he may cut the cost of production by decreasing the volume of produce. To illustrate, suppose he has one thousand acres of wheat land, half of which with the same standard of cultivation will produce forty bushels to the acre; the other half only twenty bushels. For convenience of illustration, assume that his labor including seed and care till harvest time is five dollars per acre. On the twenty bushel land this

charge will be twenty-five cents per bushel; on the forty bushel land it will be twelve and one half cents. The cost per bushel and per acre, for harvesting cannot be figured by any fixed ratio. It is safe to estimate that the cost of harvesting per acre will increase with the yield and the cost per bushel will decrease with the yield. Estimate this charge at five cents per bushel on the twenty bushel land and three and one-half cents on the forty bushel land. We now have the cost in the stack—sixteen cents for the wheat on the forty bushel land and thirty cents on the twenty bushel land. Add ten cents for threshing and sacking and four cents for hauling to the local warehouse, you have the cost per bushel on the forty bushel land, thirty cents, and on the twenty bushel land, forty-four cents. The freight rate added to this will bring the cost in the seaboard market to forty-one and one-half cents and fifty-five and one-half cents, respectively. It follows, that when wheat is fifty cents in the seaboard market the farmer will lose money on his twenty bushel land and make money on his forty bushel land. When the margin between profit and loss is narrow, every cent on the expense side of the column counts, and if after averaging for a series of years the cost of production and price received, it is found that it does not pay to raise wheat on land which will not yield an average standard crop of a certain number of bushels, the farmer will cease to sow those unprofitable acres and confine his labors to profitable acres. The inevitable result is a falling off of the volume of the product.

The traffic manager of the railroad seeing a considerable percentage of his profitable tonnage dropping off must meet the situation. It is estimated that seventy-five per cent of the cost of maintaining a railroad, including interest charge, is independent of the volume of traffic carried. Interest and taxes accrue regardless of whether any business is carried or not. The cost of maintenance is effected but slightly by the amount of traffic. Ties and bridges decay and roadbed yields to the influence of the elements with about the same rapidity regardless of the number of tons carried. Expense of station agents, dispatchers, and general officers, goes on day after day without regard to tonnage moved.

It may be instructive to take up the line of illustration I have used before, but applying it to the railroad in place of the farm. Suppose it costs eight mills per ton mile to handle the freight on a railroad system. That is to say, the average cost of moving one ton of freight one mile is eight mills. If that road carries three billion ton miles of freight its expenses in that direction will be twenty-four million dollars. Now, let us assume that its earnings on three billion tons of business amounts to the same figure—twenty-four million dollars. In other words, with that amount of business, the company is just holding its head even with the water. If it adds a billion ton miles of business on which it receives eight mills per ton, it adds eight million dollars to its income. But for carrying this additional business it has no expense in addition to that incurred for

carrying its previous business, save and except twenty-five per cent for additional operation, that is to say, the eight millions additional business costs only two millions additional dollars. It follows, that the increase of business from three billion to four billion tons makes the treasury balance show a profit of six million dollars instead of an even balance. If there should be a falling off of traffic so that only two billion ton miles are carried, the ledger will show a loss of six millions of dollars. Now let us assume that the railroad is moving along at about the three billion ton point and the farmers discover that they are unable to raise wheat at a profit on land that will not produce more than twenty bushels per acre, the wheat tonnage produced, and consequently, the wheat tonnage carried by the railroad is cut down. This loss of tonnage means red figures on the credit side of the railroad ledger. What is the traffic manager going to do to make ends meet? The first thought of the inexperienced man would be to raise the rate on the tonnage produced to a sufficient extent to meet operating expenses. But consider for a moment what would be the result of that policy. We have already seen that on the basis of present prices about twenty per cent of the cost of putting your wheat into the seaboard markets consists of the freight charge. If the traffic manager raises the rate on wheat in order to meet the loss consequent upon decreased tonnage, the expense of the marketed product is thereby increased, and in place of being compelled to go out of the business of raising wheat on the twenty bushel acres, the farmer could not afford to raise wheat, by reason of that increased rate, on twenty-five bushel acres. A further reduction of tonnage results from this decreased acreage. The traffic manager again raises his rate; the farmer again decreases his tonnage, until a point is reached that the farmer cannot produce and the railroad will have nothing to haul. I think it clearly appears from this that the business of the farmer and the business of the railroad is so inter-dependent that each must consider with great care the interest and prosperity of the other. Self-interest forces the railroad to keep its rates down to the point that the farmer can afford to pay the freight and prosper. Under the American system of free competition the basis for determining a reasonable rate is the prosperity of the producer, a rate that will make traffic and allow that traffic to move at a profit to the shipper is the law of commerce applicable to transportation.

My illustrations are not fanciful nor the product of imagination. The railroads operating throughout the world today may be divided into three grand divisions. First—those operated under government ownership, and consequently under direct government management. Second—those owned by private companies but operated under strict government control. Third—those that are owned and operated by private companies, with only such government control as is necessary to protect the people against unjust discrimination.

Prussia has had for more than thirty years a system of govern-

ment owned roads. That country is the best illustration in the world of the practical results of government ownership and operation of railroads. The French system is typical of the second grand division. There the principal roads are owned by private companies, but the government fixes the rates which all shippers must pay. This rate is adjusted upon a graduated mileage basis, and cannot be either increased or reduced, without the consent of the government minister having charge of the transportation department. America presents the best illustration of the third division. Here, heretofore, the government has given free rein to the managers of railroads to conduct their business as any other business is conducted, without interference, save to prevent oppression and guard the safety of employees and travelers.

Within the limits of this paper, I cannot go into any extended review of the history of railroads under these three systems, but must confine myself to a brief outline. At the close of the Franco-Prussian war, for the avowed purpose of bringing into a closer union the German principalities composing United Prussia, and for the secret purpose of giving the party in power in the centralized government at Berlin influence to perpetuate its supremacy, the great Chancellor Bismarck fostered the idea of the government taking over the railroads and placing their operation in the hands of the military department. This step was the bulwark of the Iron Chancellor's great political power. With control of the railroad rates affecting every interest and industry in the empire, with the power to make prosperous or bring ruin to any section or any class, he was able to dictate laws to the Reichstag and policies to the throne. No man's political power has ever been more absolute. Freight tariffs on grain from the highlands on the southern and eastern borders of the empire were placed so high that the manufacturing districts on the Elbe and the Rhine found it cheaper to import their breadstuffs than to buy the domestic product. The Chancellor met this condition by imposing a tariff upon these imports, so that the people of the grain producing districts were taxed by the government in the form of railroad rates and the laboring population of the manufacturing districts were taxed by a high protective tariff. The revenue of the government swelled enormously.

But oppression found its outlet, as it always does. The censored press could not conceal from the farmers that there were in America vast tracts of virgin soil to be had without price and without condition, save establishing a home and declaring allegiance to the republic. The immigration of European farmers to America during the decade from 1870 to 1880 was enormous. The Civil War had made its inroads into every branch of American native labor and the deficit had to be supplied from Europe. Artisans were attracted by the movement, led by the farmers, toward the New World. Living on black bread transported at a high price placed these artisans in a frame of mind which made the stories of high wages and cheap food

coming from across the seas irresistibly attractive. In a short time the tide of immigration from Europe included all classes and conditions of men. This vast flood of foreign labor resulted in rapidly settling the Western Prairies.

The prospective tonnage from these virgin lands presented a rare attraction for railroad enterprises. New lines pierced the country everywhere and carried the products of the new farms into the Atlantic States and the settlements east of the Mississippi. Over-production brought down the price of breadstuffs, and a brief period of hard times both for the farmers and the railroads ensued.

Here the American Railway System, based upon the commercial idea of "live and let live," and the state ownership-system of Germany based, as state-controlled enterprises always must be, upon the cost of service, came into sharp contrast. American railway managers studied the markets of the world, and placed in effect a rate on bread stuffs which enabled the farmers of America to reach those markets. The rate by rail to the Atlantic seaboard from Minnesota, the Dakotas, Nebraska and Kansas, a haul of from fourteen to eighteen hundred miles, was made so low that the ships on the Atlantic were able to lay down the grain in England and France at a less cost to the consumers in those countries than the state owned railroads charged for the short haul from European farms to the ports of the North Sea on the one side and the Black Sea on the other. Prussia itself was quick to see that its high tariff on breadstuffs was ruining its manufacturing. Industry in manufacturing lines was being driven to the free trade countries where American wheat was admitted free. Germany in order to preserve any manufacturing was compelled to reduce the price of grain by removing the prohibitive tariff. It was manifest that her railroads with the inelastic methods inseparable from state control were unable to reduce freight rates to the American standard. The only alternative was to admit American grain. By that means she restored manufacturing but in doing so opened up her market to the products of American agriculture. American manufacturing revived in the meantime, and again the country in all its parts resumed a footing of normal prosperity. Tonnage upon the railroads increased so rapidly that the rates which were at first put in to meet the emergency of the Panic became profitable rates. These low rates, lower than had anywhere before that time existed, with the steady development of the country since that time, have been still further reduced.

In railroadng, as in every other industry, "Necessity is the mother of invention." Declining prices of transportation have necessitated the development of new industries and new sections of country in order to increase tonnage, and increased tonnage in its turn has resulted in vast improvements in the machinery for handling it.

France has pursued the policy of protecting each company in the enjoyment of a profitable rate, that is, a rate based upon a fair



THRESHING HEADED GRAIN, WALLA WALLA COUNTY

margin of profit over and above the cost of transportation. The result of this system is that there is no inducement to build competitive lines. There is no inducement for existing lines to make improvements which will decrease the cost of service. Any man who works or does business upon a fixed percentage of profit and is free from the influence of competition will not lose sleep to study out a way to reduce the amount on which that percentage is calculated. Railroad companies are simply men acting collectively. The same motives control corporations and individuals. The two great railroad systems of France serve a population exceeding in density the population served by the Northern Pacific Railway Company more than two hundred per cent, while the rate per ton mile for freight carried on these railways is more than double the rate per ton mile charged by the Northern Pacific. The rate on the state railways of Prussia per ton mile is almost double the average American rate, and is more than seventy per cent higher than the average rate charged on the Northern Pacific. Russia, with peasant labor and inferior service, has made a somewhat better showing than either Prussia or France, but there the rates are higher than in America, and on the products of the farm exceed those of America by more than twenty-five per cent.

We have in this country a great many sincere advocates of the State Ownership System. We have a larger number of advocates of the Government Rate-making System. The question of the extent to which we shall modify what may be termed the American Commercial System of rate making by the companies owning and operating roads, is the most prominent economic question before the American public. That in the management of American railways there have been and are abuses of power, resulting in oppression and wrong to communities and individuals, cannot be disputed. Republican form of government itself has its weaknesses, and republican governments have been the instrumentalities of oppression. But is it to be argued from this that civilization should discard the republican form of government, because it has been abused? Is it not more reasonable to preserve the present system as a basis and change only in those respects which have fostered abuses?

Only a few centuries ago all property was owned by the kings of the earth. Men in lower estate lived only by the will of the king. Their right to earn food and clothing, and to bear arms in defense of their person was a subject of grant from the crown. The right to till the ground, the right to take fish from the sea, the right to buy and sell in the market-places, were all the subjects of crown grants, for which tribute had to be paid in shape of a license. In the progress of civilization, as men became more independent and enlightened, they cast aside this burden. They seized the lands they occupied and tilled them at their own pleasure. They asserted their right to trade with each other without interference, and our English ancestors killed a king in order to demonstrate their right to enjoy

individual liberty of person and property. It has been the boast of our form of government that it derives its power from the consent of the governed, and that every man and association of men, as long as they do not trample upon the liberties of their fellow men, shall be free and untrammelled in their pursuit of happiness, which includes the right to trade with each other, the right of one man or association of men to sell the product of either hand or mind to whomsoever will purchase at a price agreed upon between them.

We have now presented to us the important question of how far we should recede from this standard of individual liberty, how far we shall resign to the government the rights which our ancestors wrested by the sacrifice of blood. There is no question that the idea of government ownership, or absolute government control, which amounts to the same thing, is a retrograde step. Social philosophers tell us it is a step in advance. If a step in advance, the advance is on the line of a circle which will lead us back to the place from whence civilization came. The advanced socialist makes no concealment of the fact that government control of so-called public utilities, such as transportation, is but a step in the direction of socialistic conditions embracing every industry. These men are honest and fair. They are honest in their belief and fair in their method of pursuing a way to their objective end. There is another class of economists who are fooling themselves and are seeking to fool us all, by the false philosophy that there is distinction between such a quasi-public business as transportation and the ordinary private business of life. They tell us that modern commerce can be carried on only by means of great transportation facilities, and that consequently it is a function of the government to supply this great instrumentality of commerce; that it is like the currency which is a medium of exchange and should be coined only by the government. We grant that transportation is a necessary article of commerce. But is not bread necessary to human life itself? Ought it for that reason to be taken out of the list of those products which the individual should produce and sell in his private capacity. Because wheat is necessary to the maintenance of life should it be produced and sold and distributed by the government? That is ultimate socialism. The socialist will include the production and distribution of all food, clothing fuel and other necessities as a proper function for the government and will tell you that there is no difference between the production of food and the sale of transportation. We agree with the socialist that there is no distinction. The difference is that those who stand for individualism do not believe in the communistic theory. It has been "tried and found wanting."

There is some force in the suggestion that transportation is a commodity that everybody must use and therefore in a way resembles currency. The currency consists of silver and gold. The government furnishes neither the silver nor the gold to make it. All the government does is to put its stamp upon it, which is a certificate of

its weight and fineness. It is then returned to the channel of commerce and is bought and sold for labor and comforts according to the will, whim and fancy of every person who has it. I agree that railroads should make public through government agencies their rates, so that every person may know what every other person is paying for transportation and that secret cuts and rebates should be absolutely prohibited. I agree that the government should not permit these corporations engaged in carrying the articles of trade to speculate in outside enterprises. It should not permit them to water their stocks and claim fictitious dividends upon watered stocks. The government charter should be a certificate of honesty and in order to preserve honesty, these corporations should be compelled to operate in the daylight of publicity. Their books should be open to the world so that their patrons and the world at large may know how much money they are making; and how they are spending what they make. Such publicity would protect the corporations from graft and protect the public from corrupt practices by the corporations.

In normal times there is always money seeking remunerative investment. If charges of these railroad companies for transportation bring a return exceeding the limit derived by capital from other classes of investment, that capital will quickly shift to building railroads and charges will come down by the very force of competition. It is sometimes said that of recent years there have been such consolidations that a practical monopoly in the carrying business has resulted. If you will compel the monopoly to show how much money it is making, and if it be found that it is making more than private capital is making in other channels, the monopoly will soon go to pieces as the result of its own extortions. There is only one way that a monopoly can preserve itself, and that is by making its charges so low as to render the field unattractive to competitors. When charges are brought to that basis there is no need for government interference.

One of the difficulties of government rate making is its unwieldiness. Government of necessity acts by some fixed rule, while the rule of commercial management is quick adaption to existing conditions. Take the illustration I have given. Suppose, it be found that the farmer cannot profitably produce wheat on twenty bushel an acre land at existing rates, the intelligent traffic manager will figure out a rate at which he can produce wheat on that kind of land at a profit. The railroad cannot afford to lose the tonnage if it can make enough on it to pay the bare charge of moving the cars.

We have this illustrated strikingly in the fixing of rates on the product of mines. No other tonnage is handled by the railroad which is easier to handle or involves less risk. I have been asked the question why the miner is charged on certain ores two cents per ton mile and the farmer is charged for hauling his wheat eight mills per ton mile. The only answer is that under the American commercial system of making freight rates the miner is charged two cents on a

product on which he can afford to pay two cents, so that the railroad company can afford to haul the farmer's wheat at eight mills, which is the highest price he can afford to pay on his product. To charge the farmer more would mean to close his farm. To charge the miner less would be a step in the direction of the railroad's bankruptcy.

One of you producers in this audience may have two horses to sell. One is a Belgian or a Percheron, which will weigh eighteen hundred pounds. The other is a standard trotter, which will weigh one thousand pounds. Both animals were raised on your farm. The heavy one consumed more feed and probably cost you more than the light one. You take them both to the city market. The standard trotter on account of style and speed attracts one buyer, while the heavy animal attracts another. The light one may bring five hundred dollars while the heavy one will not bring to exceed two hundred dollars in the market. Is the difference based upon the cost of production? The cost of production is an element, but by no means the controlling element which influences the price of an article in commerce. The main factor in fixing the price of transportation is what the purchaser can afford to pay. The same factor has equal prominence in fixing the price of labor, rents, farms, forests, books, pictures and all other articles bought and sold by mankind. If the railroads asks for transportation the highest price it can get at that time, the producer will have no inducement to stay in business. That method of treating the producers would be like the fable of killing the goose that laid the golden egg. The railroad must fix a rate which will allow the producer to lay by money in years of good yield and in years of high prices, so that they may continue his industry under less encouraging circumstances. On the other hand, you producers will find it an advantage to allow the railroads in years of abundant tonnage to lay aside a surplus to revise their grades, to straighten their curves, and to buy improved machinery, so that in the years of poor crops and low tonnage the railroad may be able to carry you over without increasing your rates when you cannot afford to pay.

The whole logic of the situation is that both interests must work together. If you quit business the railroad must quit business. The duty on each side is clear and admitted. I believe that all candid men who will study the question will lay aside resorting to government ownership or resorting to absolute government control. I believe the vast majority of candid men, after discussion and reflection, will be content to accept such reforms as will eliminate existing abuses of corporate privileges, and after those abuses have been eliminated, allow the corporations to deal with you upon a commercial basis. In other words, you will be willing to perpetuate the commercial system in preference to the State system.

In Prussia it was one of the arguments for government ownership, that the railroads would in that way be eliminated from partici-

pation in politics. The result is a matter of history. The railroad rate question is constantly embroiling the country in sectional political agitation and legislative log rolling. In America more than one million voters are directly and exclusively employed by the railroads. It is seldom that a president is elected by a majority amounting to this number. Under a system of government rate making would there not be great danger of attempts to control this vote by considerations of self-interest? I am clearly of the opinion that the best way to keep business out of politics is to keep politics out of business, and vice versa. I am equally clear that there should be a reasonable measure of state restriction so that all classes and persons shall be fairly treated, to the end that there may be no unjust discrimination and that extortion may be prevented.

The farmer by reason of his surroundings and the nature of his business transactions stands preeminently for individualism. He lives alone; he works alone; he produces the articles in which he trades; his view of nature is bordered only by the horizon; and the air he breathes is not tinctured with microbes which eat the body and destroy self-reliance. Socialism thrives in the close confines of the city. It is the product of ill health and bad morals. If the managers of corporate property are wise, they will seek harmony in their business relations with the citizenship engaged in agricultural production. Their country is your country; their interests are your interests. If there has been any general prejudice in your minds, I am satisfied it has been the result of mutual fault in not getting together and talking over our differences and seeing what can be done for each other. We should agree upon some plan of settling our trivial differences upon a just basis.

THE BASIS FOR THE STATE GRADING OF GRAIN.

By HON. S. S. KING, Deputy Grain Inspector, Tacoma.

The inspection and grading of grain has been in vogue as long as the purchasing and milling of the same has been in operation. Different methods have been adopted, from time to time, in different localities.

I remember very distinctly that when I was a boy and went to market with my father the buyers used to climb on the wagon load of wheat, and untying the sack, open it and examine the grain, and from such inspection make their bids. Often there would be two or three buyers on the load at once, and each attempting to secure the same. In those days, and in that locality, every farmer always cleaned his grain by passing it through a fanning mill before taking it to market or mill, and when it was unloaded it was ready to go directly to the hopper, and from that to the millstones. The only question to be settled by the inspector was as to the milling qualities of the wheat.

In later years, as the farmers of the Pacific coast began to raise wheat in large quantities and none of them had barns or storage capacity for handling it after it left the threshers, it became the rule to haul the wheat directly from the threshers, where it had been sacked, to the warehouses, and from there load it on the cars and send it to market without cleaning. As this wheat went to the mills, either here or across the ocean, it became a matter of considerable importance to know what kind of wheat was contained in the sacks so shipped, and the relative value of the grain for milling purposes.

Several conditions enter into this question of value, and they have to be settled by some one on inspection. As different varieties of wheat contain different proportions of gluten and other properties that go to make up their values for milling, it is first essential to correctly judge to what variety any certain lot of wheat belongs. After determining this, the next point is to determine the relative value of this particular lot; as the milling quality varies according to whether the wheat is heavy in gluten or light, and that property lacking.

For quite a number of years after the growing of wheat in this state became a thriving industry the inspecting and grading was left entirely in the hands of the buyers, and was settled by their employees after the wheat had reached the terminals at Portland and the Sound; and as it is human nature for every one, persons or corporations, to always look out for themselves, it became a bone of contention between the interior shippers and the terminal buyers as to what was the correct grading of much of the wheat. The interior shipper often complained that when the price of wheat went down, after he had sold, but before the wheat reached the buyer, it was invariably graded off; while, on the other hand, if the price went up there was no complaint. If there happened to be a little off grade wheat in a car he complained that the buyer wanted to call the whole car off grade, or rejected.

These complaints became so general and persistent that in 1895 the legislature of the state passed a law creating a Grain Commission, and a State Grain Inspector. The duties of the Commission are to fix the several grades of the different varieties of grain, and determine, by whatever means they may find the most expedient and best, the relative values of each variety, and determine the methods of inspection to be followed by the inspector and his deputies.

The value of this state inspection, to the grain growers, is admitted by nearly all, except those whose interests would be better served by allowing each exporter and shipper to fix his own grade, to have been very great.

At the time the law went into effect, and up to the fall of 1905, the standard test for No. 1 wheat in California has been sixty pounds and in Oregon fifty-nine pounds. These two states being the only ones, either east or west, that have maintained the standard test above fifty eight pounds; and until the commission of this state fixed

the standard here at fifty-eight pounds, all the growers of this state had to sell on that basis. While he had to sell his wheat testing fifty-eight, fifty-eight and one-half and fifty-eight and three-quarters pounds on a basis of No. 2, he never received any premium for his wheat testing sixty, sixty-one or sixty-two pounds.

The State Grain Commission, some years ago, fixed the standard test for No. 1 wheat at fifty-eight pounds, and fixed a new grade of "Choice Milling," making the test for the same sixty and one-half pounds; and later on reducing that to sixty pounds.

The grain dealers of Oregon and California have come in competition with the dealers of this state in many places, and in all such places have invariably paid a No. 1 price for fifty-eight pound wheat, thus demonstrating the fact that the market would justify that standard.

In the fall of 1905, the Grain Commission of the Portland Chamber of Commerce, a committee composed of the heads of the grain exporting firms of Portland, and the secretary of the Grain Exchange of San Francisco, argued long and earnestly with the Grain Commission of this state in an endeavor to prevail upon them to increase the standard to fifty-nine pounds, so as to have it uniform on this coast—the San Francisco Exchange having decided to reduce their standard to that basis—and when the Commission refused to so increase it, San Francisco immediately reduced their standard to fifty-eight, but Portland still maintains theirs at fifty nine. If the exporter would increase his price for No. 1 wheat if raised to fifty-nine pounds there might be some excuse for asking to have the standard raised, but the Commission here took the ground that as they had not done so in the past they would not do so now, and I think they were correct.

The facts are that nearly all cargoes exported to foreign countries are shipped on the basis of what is generally known, among grain men, as "F. A. Q.," or fair average quality, and in making up this grade or sample, for their cargoes, they mix all the different grades that are fit for milling, and an average sample of these is taken as such standard. This standard necessarily must change from year to year, as the crops vary. During a season when the wheat all matures in good condition, and there is but little wheat below the No. 1 standard this F. A. Q. will, and should test, above No. 1, while in a very poor year, and there are occasionally some of these, it will go below.

In making up this sample the exporter can take his fifty-nine and one-half, sixty, sixty and one-half, and sixty-one pound wheat and mix them with an equal quantity of fifty-seven, fifty-six and one-half, fifty-six, fifty-five and one-half, and fifty-five pound wheat and the mixture is a cargo of fifty-eight pound wheat, which he gets a No. 1 price for from the foreign buyer. Under the old arrangements, in this state, and those still prevailing in our sister state of Oregon, the buyers fixed their own standards, inspected their own grain, in-

coming and out-going, and made their own certificates to the same.

The endeavor and intention of the State Grain Inspection Department is to have the grain inspected and judged by those who, having no personal interest in the matter, shall fix the grade impartially, and thus act as an arbitrator between the seller, or shipper, and the buyer; and this is what the Chief Inspector is trying faithfully to do. He is endeavoring at all times to employ only men of experience in the handling and grading of grain. There are, of course, emergencies arising when he is forced, for a time at least, to employ new men who may not have had such experience as an inspector should have had, but this condition is caused by the receipts of grain being so large that the regular force is not able to keep up with the work. Some of the men now on the force have been on ever since the department was first organized in 1895.

The best of men, however, are liable to make mistakes at times and of course we hear complaints from time to time; and while we always look up all causes of complaint and correct them when we find the inspector is at fault, we find very frequently that the complaints are groundless and the shipper, who at first thinks his grain is graded too low, often is forced to admit, when he sees the same, that he was mistaken as to what he had shipped. I find the shipper is often unaware of the condition of the grain shipped. He has not been careful enough in taking the grain into the warehouse or in loading it into the car, and it frequently happens that there are a large number of sacks containing smutty or dirty wheat which he will not believe are there till he sees them after they have been separated from the clean by the inspector.

In a season like the one just passed we frequently find that grain has been left in the field, covered with straw, in some cases, and not covered in others, and owing to the heavy fall of rain the sacks have become wet in spots, and the grain, next to the sacks, has sprouted or moulded. In many such cases we have had strong protests from the shippers because we have graded the wheat or other grain, rejected. In taking it into the warehouses and in shipping it out again, parties have failed to note these stained spots on the sacks, and have thought the grain was all right. In fact, if you look at but one side of the sack, it appears all right, but on the other side may be a spot, where the grain, for from two to three or more kernels deep, is moulded and sprouted, and when the grain is emptied from the sack these spoiled kernels will mix with the good and thus spoil or greatly damage the whole lot. We are blamed in some cases for finding these spots, but that is what we are there for, to find the bad as well as to determine that it is not all bad when it is not.

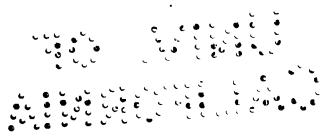
The wheat of this state, for inspection and shipping purposes, has been divided into three general classes. They are Club, or White Walla Walla, Red and Bluestem. Their relative values are supposed to be fixed according to their merits for milling purposes; the Bluestem ranking first and the other two about alike. Each of these



PUSH BINDER AT WORK



AN UNUSUAL SCENE—THRESHING FROM STACKS, SNOW ON THE GROUND



classes is again divided into numerous varieties of the same family, and the only way to determine their separate values is by actual milling tests or tests by analysis. This latter method is being done by the chemical department of the State College, and we hope, by their aid, to be able another year to fairly fix the actual relative values of the different divisions of each family of wheat, and also to fix the relative value of each of these grown in different sections of the state.

In the Bluestem family we have at least four distinct kinds, and several others that are so closely allied that we are compelled, in most cases, to grade them as Bluestem. In the Club family we have at least five kinds, and several others that we are compelled to place with them. In the Red variety there are at least three distinct clans and innumerable side families.

All of these varieties and kinds should be classed and graded according to their relative merits, which are based usually upon the per cent of gluten contained; but to so classify and grade them would require the inspector to be a competent chemist, and also require the taking of time to analyze the samples from each separate location, as there is no question but the same kinds of wheat from the drier sections of the state contain a larger per cent of gluten than those from the moister sections. The same variety of wheat taken from Franklin county or any other of the drier sections, and sown for two or three years on the heavier and moister soils of eastern Whitman county, will show a marked difference in color, hardness and per cent of gluten. This difference is more clearly defined in the Red varieties than the White, for the reason that as the wheat decreases in hardness the color fades and the berries begin to show a decidedly yellowish color. This difficulty could be largely overcome by changing seed every year, or never sowing seed grown on the same soils, but getting new seed each year from the dry sections.

The Bluestem wheat raised in the "Great Bend" country—so called—or along the main line of the Northern Pacific railroad and the Great Northern, is of a much harder nature and more glutenous than the Bluestem raised south of Snake River in the Eureka Flats and other portions of Walla Walla county, or the Palouse country. This is largely owing to the fact that most of the Bluestem grown south of Snake River is from seed originally brought from Australia or New Zealand, and is what is sometimes known and designated as "Purple Straw," while the Bluestem raised north is of a different variety and contains always a larger per cent of gluten, although the appearance of the first is equally as good, if not better than the latter.

The quality of the wheat in many sections might be improved by obtaining and using seed from those sections raising the best qualities of the same kind. The variety of Red wheat known as "Jones Fife" when first sown in eastern Whitman county, was a dark red, and a very hard kernel, but after being grown on the same soil, where so much moisture prevails, for two or three years, the color

bleaches to almost a yellow, and the berry is much softer, and consequently contains a much smaller quantity of gluten.

In getting seed and preparing it for sowing the grower should always take into consideration the adaptability of his soil for certain varieties and not attempt to grow such varieties as he does not know will thrive and produce the best results.

It has been shown by numerous experiments with grain that the protein or gluten is contained, practically, all in the hard portion of the kernel, or outside of the germ; therefore, that variety of wheat which has the hardest and most translucent appearance is the best variety to grow generally.

The Grain Inspection Department, in all the time since it was organized, has attempted to determine which are the most valuable varieties of grain and place such in the highest grades, and they are now working, in conjunction with the State College, to have still further experiments made to determine which varieties are the best, and which sections of the state raise the best of these varieties.

The Department has tried, in all cases, to make careful inspection of all grain received, by making first what is known as the "Track" inspection. That is by opening the cars on the track and getting at such of the sacks of grain as can be reached; making a general estimate of the grade and quality of the grain contained in the car. Later on, when the car is being unloaded at the warehouse, the department keeps a man, or men, at each house who tests or punches each sack as the car is unloaded, and if he finds a different grade or grades from that found on the track, he separates the several grades and classifies each in their proper order. It is often found that there are as high as eight or ten grades in a car, and it is not to be wondered at that the inspectors, in some cases, make mistakes. It can readily be seen that it is important that the inspectors should be well posted regarding the different varieties and qualities of grain, and that they should have large and extensive experience. The longer a man, who proves competent, works at the task, the more valuable he becomes and he should be continued in his job regardless of politics.

I have it often put up to me that at times the exporters have been willing and have accepted wheat on a basis of No. 1 while the state inspectors would not so grade the same. This I admit has in some cases been done. The exporter has been so anxious for wheat at times that he has been willing to, and has accepted wheat on a No. 1 basis that should have been graded lower. This is no reason why the state grading was not right and just, but only shows that there may be times when the exporter is willing to accept wheat below a No. 1 grade at a No. 1 price, while in many other cases, if the state was not doing the grading, he might and would try to discount wheat that should grade as No. 1. We have always tried to grade on a uniform basis, but admit that there are times when mistakes are made.

I have been asked what are the benefits derived from this state inspection? And in reply say:

First—The fixing of the standard at fifty-eight pounds is worth more every year than the whole expense, many times over. If one-fourth of the wheat crop will weigh between fifty-eight and fifty-nine pounds, and I think this a fair estimate, the difference between a No. 1 price and a No. 2 price, which will be about two cents per bushel, would, in such a year as 1905, amount to about \$160,000, or if the difference was only one cent then it would amount to \$80,000.

The cost of inspecting the whole crop, if it was all shipped to the Sound ports, would, estimating the crop to be sold and shipped at thirty million bushels, and that amount will not, of course, go there, to about \$20,000. As the portion of the crop which goes to Portland in many places comes in competition with the Sound buyers, it also gets the same benefit, of state inspection, as that which comes to the Sound. The cost of inspection per bushel, when the Department was first established, was about one mill, while at the present time, owing to the increased size of cars, it is only about five-eighths of a mill per bushel.

Another point of vantage is the fact, that were there no state inspection, all wheat containing a small amount of smut would be graded rejected, and would have to take a maximum of discount, or sell as merely feed wheat, while under the state inspection rule of grading, that which is only moderately smutty is graded as "No. 1 if smutted" and is discounted at the minimum, and by being so graded there is a saving of from three to ten cents per bushel to the grower. Also before the state began grading and inspecting, all wheat that contained dirt, wild oats or cockle was graded as rejected, while now it is graded and paid for as "No. 1 if cleaned," where the wheat when so cleaned is all right, and a saving is made there of from one to five cents per bushel.

I wish here and now to impress upon the minds of all present, both farmers and shippers the importance, in a financial way, of cleaning their wheat before sending it to the terminals for export or milling.

The experiments that the State Grain Inspection Department has been making have demonstrated the fact that out of all samples cleaned we get seven per cent of foul or foreign matter which brings no returns to the farmer if he ships it, but which if cleaned out and kept at home and ground and fed to his stock is worth a considerable amount of money.

The crop of 1905 amounted, in the State of Washington, to a little more than thirty-three million bushels, and if one-half of this was dirty, and I do not think I am over estimating it when I take it for granted that that proportion would need cleaning, we have about eight million of sacks required to hold the dirty portion of the crop. If we clean the wheat we save seven per cent of that number of sacks, or 560,000 sacks, which at an average of eight cents each would

amount to \$44,800. Now if the wheat was cleaned by the farmer or the independent shipper before sending it to the coast he would fill the sacks so much better than they are usually filled at the threshers that they would hold at least seven per cent more than they did when first filled. This would make another saving of the same amount, thus making the total saving on sacks alone \$89,600.

Again if half the crop is dirty and needs cleaning and the crop so needing cleaning amounts to 16,000,000 bushels seven per cent of that would amount to 1,120,000 bushels, and as the average freight from Eastern Washington to the Sound or Portland is twelve cents per bushel, the freight on the amount so cleaned out will amount to \$134,400, which is a clear saving to the farmer as he gets nothing for this dirt, or comparatively nothing.

Another item of saving to the farmer can be made by cleaning out this foul matter from his wheat and for which he receives nothing, and that is the foul matter itself, which if he will clean it out and chop the same and feed it to his stock will become an item of great value. If seven per cent of the crop is foul matter and the crop amounts to thirty-two million bushels, the half or 16,000,000, when cleaned will give 33,600 tons of feed, which should at a low estimate be worth \$10 per ton to the farmer to chop and feed to his stock, and this amounts again to \$336,000.

The value of these three items added together amounts to the sum of \$560,000 which the farmers of this state are now throwing away, or giving to the terminal buyers, which is in effect the same thing.

There is still another item which is of value to the farmers which should be taken into account in this subject of cleaning the wheat before taking it to market, and that is the fact that the balance of wheat left after cleaning out the foul matter will, by reason of being clean, test from one to two pounds better than it did before cleaning, and in consequence of being so cleaned and so testing bring him from one to two cents more per bushel. If 16,000,000 bushels of the wheat crop of the state needed cleaning and the foul matter amounts to seven per cent or 1,120,000 bushels, there would be left of the wheat when so cleaned, 14,880,000 bushels, which at an advance of one cent per bushel because of being so cleaned would amount to the further sum of \$148,800. These several items taken as a whole will swell the returns to the farmers for the trouble of cleaning their wheat before shipping to the not to be despised sum of over \$700,000. Is this sum worth saving, or is it too small to be taken into consideration by the farmers who by reason of good crops and fair prices have during the last eight years become the bankers of the Inland Empire?

SHALL WE HAVE A NEW SYSTEM FOR GRADING?

By HON. J. W. ARRASMITH, State Grain Inspector, Tacoma.

The question as to whether we shall have new methods of inspection and grading of grain, seems to be a proper question for discussion here, inasmuch as there is a prospect that a bill may be introduced in Congress, and urged for passage before both houses creating a National Inspection Department. Senator McCrumber, of Dakota, I believe, introduced a bill some time ago for that purpose, which the papers have lately affirmed he will again introduce during the present Congress and endeavor to push to final action. The ground taken by the advocates of a national system of inspection, is that we would then have a uniform system of grading throughout the whole country, and that all shipments abroad would be of one standard, and, therefore, more satisfactory to foreign buyers. This point was urged with a considerable degree of force by Senator McCrumber in an interview in some eastern paper a short time before the convening of Congress, and he referred, as a proof of the advantage of national over state inspection, to the fact that a shipment from Texas to some French port, a few years ago, was not up to the standard samples which had been issued by the body governing the inspection at the Texas port of shipment, and that, therefore, the French buyers lost all faith in the efficiency of the inspection system, not only of the Texas port, but of all other inspection in this country.

If I am correctly informed, there is no state inspection in Texas, but each grain distributing point, through a Grain Exchange or Chamber of Commerce, appoints its own grain commission and grain inspector, and therefore the inspection is really all in the hands of the exporters, who are the interested parties, and they make up their own standard samples, pass upon their own grades, issue their own certificates and send out in advance such samples as they may see fit to their foreign correspondents, and if the cargoes, when received at the foreign ports, are not up to standard samples, the consignees have no one to look to but the shipper himself. Another instance cited by the senator was the shipment of a cargo of oats from Seattle, in this state, during the season of 1902 or 1903, I am not sure which, by the Quartermaster's Department of the Government, to Manila. It appears that when this shipment reached Manila the oats were found to be in a very bad condition and, owing to the fact that they were damp and soft when loaded, they were mouldy and rotten when they reached their destination. The senator used this as a strong argument in favor of taking the inspection of grain out of the hands of the State Inspectors and having all such work done by the general government. The senator said that the condition of the cargo when it reached Manila, was blamed, by the Quartermaster's Department, to faulty inspection at Seattle.

This argument, if of any force at all, should be against national inspection, rather than in favor of it, for the reason that this ship-

ment of oats was never inspected by the State Grain Inspection Department, because of the fact that they were never called upon to inspect the grain. The oats were inspected by government employees of the Quartermaster's Department, and by them passed as O. K. The State Grain Inspection Department was never called upon by the government to inspect any shipment of grain of any kind, either to Manila or any other port, till the fall of 1905, when a shipment of oats was being received at Seattle for shipment to Manila, which had been inspected by the employees of the government at some point east, I think at Minneapolis, and when received at Seattle the Quartermaster there did not feel justified in accepting them, and, therefore, asked permission of the government to secure the services of the State Grain Inspector to reinspect the shipment.

The fact that the grains of no two sections of the country are alike, either in appearance, hardness or milling qualities, would preclude a National Board of Inspectors from making a general standard sample, and no rules for grading could be promulgated that would be adaptable to all sections; therefore, the rules and methods of inspection would necessarily have to conform to the conditions of each section separately, and, in my opinion, can be more judiciously handled by a board located in each particular section than they could be by a board familiar with only one section.

The grains of Texas are entirely different from those of Minnesota, Dakota or the Pacific Coast, while those of Minnesota and the Pacific Coast are as entirely different as those of that state and Texas or Illinois or Michigan. Grain brought from Dakota or any of the Middle Western or Northern states to Washington or Oregon and grown here for two or three years so completely lose their identity that the grower of the original seed would fail entirely to recognize it if it was shown to him. Even the same wheat grown in different sections of our own state so completely changes its characteristics that it is almost impossible to recognize the two lots as of the same origin.

I do not believe it would be any improvement on the present methods in this state to turn the inspection over to the general government. In fact, I do not believe the business could or would be so well handled. There is but one thing in its favor, in my mind, and that would be that, placed in the hands of the general government and placed under civil service rules, as I suppose it would be, it would be taken out of politics and, in that respect, improved. The same result could and would be reached by placing the state inspection under civil service or at least allowing or requiring the Chief Inspector to make changes in the force for good cause only; thus enabling him to administer the affairs of the department more fully in accordance with sound business principles.

The matter of so changing the methods of inspection as to have the state inspectors fix the amount of dockage necessary to be made on dirty and foul wheat has been agitated for the last two years by the shippers and exporters. The Grain Department has been experi-

menting with several devices to find some kind of machinery which will successfully clean small samples of foul wheat, and thus enable them to determine what per cent of the grain, as received, is wheat, and what is foreign matter.

This department about a year ago purchased a small, or model fanning mill, complete in all details as to screens and sieves, and during the month of October, 1905, had each deputy inspector save a sample of the dirty wheat in such quantities that we could run it through this little mill, or some other sieves. We made a thorough test on these samples and, while we found that we could clean the wild oats, cockle, rape seed, and other kinds of foul matter from the wheat, we also found that to so clean them required more time and expense than the department considered it could afford to spend in the matter. To successfully clean out all of the wild oats, especially from the wheat, involved the taking from the sample of more of the small berries than we thought was justified or would be fair to the farmer and shipper, then to have to guess at a portion of the dockage did not seem to us to be a fair way of getting at the correct per cent. We, therefore, abandoned the use of this fanning mill and are now experimenting with what is known as the gravity needle screens. By using these screens with about twelve sets deep and having five or six sets of them, each of a different grade or size, we begin to think will be the nearest correct of anything we have yet experimented with, although we have not yet tested them thoroughly enough to fully satisfy ourselves as to their adaptability to the work for which we need them.

In our experiments, so far, it has developed that the actual cost of cleaning these samples is from ten to fifteen cents per car, and as a large per cent of all the cars received have more or less dirty wheat in them it amounts to about that additional cost on the inspection of each car. It costs as much to fix the dockage on 50 or 100 sacks in a car as it would for the whole car if it was all dirty. While there is no question in my mind, but that the State Inspectors should really fix the dockage on all dirty wheat, it still becomes a question of the possibility of doing this additional work and paying the expenses of the same out of the fees prescribed by law for inspection.

Another important matter, to my way of thinking, which would be new, so far as this department is concerned, is the question of having the weighing of all grain placed entirely under the control of the State Grain Inspection Department. As the law now stands, while the State Inspector has the licensing of all weighers and may, whenever he thinks it for the best interests of all, cancel the license of any weigher, the fact remains that the weighers must be paid by the warehousemen, and are directly responsible to them for their jobs. The instructions of the Chief Inspector to all his deputies is to watch the weighers and weighing as closely as possible and report any deficiencies which he may notice; still he cannot, at all times, keep his eye on the scales and at the same time properly inspect the grain

passing over them, and at no time can he be sure that even when the weighing is all right that the figures set down compared with there adding of the scale beam. In order to have this weighing done by parties entirely under the control of the state and paid by it, so as to be entirely disinterested, would require at least an additional expense equal to that now involved in inspecting.

On the whole, we have comparatively few complaints regarding shortage in weights, and in many cases where we have had such complaints and we have personally re-weighed the cars, we have found that the mistakes were as often with the shipper as with the consignee. If the wheat could only be handled in bulk we could easily do both the inspecting and weighing, and still reduce the fees. If the farmers would adopt a system of cleaning all their wheat from the wild oats and other foul stuff before shipping, it would then be possible, I think, to both inspect and weigh, as the work of inspecting would be very greatly reduced. In addition to the possibility of so reducing the expense of inspecting, so as to enable the department to do the weighing, the farmers would find it a great saving, I think, by cleaning all their grain before shipping. The saving in the price of sacks alone would be nearly 15 per cent of all they now cost, and there would be a further saving of quite a large per cent of the freight charges; and in addition to these the screenings so cleaned out can always be used to better advantage, if chopped and fed to the stock on the farm, than if they are sold and shipped. I would like to urge on all the importance of so cleaning their grain.

With the changes herein suggested in our present system of grading and inspecting, in this state, I believe the demands of all interests involved would be fully met, hence I conclude that we do not need new systems for grading grain.

Adjourned to meet at 9 a. m. Jan. 12.



WHEN THE HARVEST DAYS ARE OVER



WAITING TO DELIVER WHEAT AT THE WAREHOUSE

100

100

100

100

100

100

SECOND DAY

The Convention met at 9 a. m. and after considerable informal discussion proceeded with the program for the day, the first paper being on "The Milling of Wheat," by Mr. Samnel Glasgow, of the Centennial Mill, Spokane. (As Mr. Glasgow delivered his address from notes, of which stenographical copy was not taken, and owing to the fact that the gentleman is travelling in Japan as the report goes to press, this very excellent paper is of necessity omitted.)—

WHAT IS MILLING VALUE IN WHEAT?

By MR. J. T. BIBB, of Tacoma.

The State College of Washington is to be congratulated upon its success in convening there such interests as the Wheat Growers, the Wheat Carriers and the Millers, for the purpose of promoting a better understanding between them on questions of vital importance. Political pariahs have created the impression that these industries are antipathic but I predict before this convention adjourns we will all agree that wheat-growing and milling are so vitally linked together that promoting the one promotes the other and enhances the welfare of the community.

Before proceeding with my subject I wish to express to the faculty my deep appreciation of the honor conferred upon me in placing my name on the program.

EVIDENCE OF CIVILIZATION.

No industry conducted by man is of greater concern to the human race than that of milling. The mill and the loom are the two first decisive steps from nomadic to civilized life. If I tell you what food a people eats, and how it clothes itself, you can at once tell what progress it has made in civilization. In early stages of civilization we find in use coarse, crudely milled flour but later on a white, well-milled product, and later still, when a high degree of modern civilization is attained, the miller is required to sacrifice many virtues of flour and over-mill it for color. At last, with the appearance of the claw-hammer coat and the décollete dress, he is required to chemically bleach to a deathly white.

ROLLER PROCESS.

Milling perfection was approximated when the roller process was adopted. With this process came sifters, reels, purifiers and

other devices for reducing and separating the white, well-dressed flour from the low grades and the offal, resulting in patent flour. We may gain a clearer idea of the potent factors that determine the milling value of wheat by briefly reviewing the analysis of wheat, flour and bread; and first as to the

CONSTITUENTS OF WHEAT.

The principal constituents of wheat, so far as we are now concerned, are gluten, starch and water. Approximately the percentages of these constituents in our western wheats, by Chidlow test, are gluten, 20 to 40 per cent, starch, 50 to 75 per cent and water, 10 to 15 per cent. When a sample of wheat is offered the miller, or a sample of flour offered the baker, his first interest is what is its strength, or, in other words, how much gluten does it contain? This suggests a word about

GLUTEN.

Gluten is the life and predominant constituent of wheat and flour; indeed it is the chief factor that determines their values. If of good quality it is a dark, straw-colored, translucent substance, belonging to the albumens, and is that which gives adhesiveness to dough. When separated from the starch by washing in water, it is tenacious and elastic and if formed into a ball and laid upon a plate will flatten into button-like shape and resemble glue. If of poor quality it is ragged and stringy and low in expansive qualities, making a dark, soggy loaf in baking. I place before you two samples of gluten, one a light colored, translucent sample, taken from Bluestem flour, the other a dark, dense sample taken from Red Russian flour. Although the same quantity of flour was used in each case, you will observe the Bluestem sample is nearly twice the size of the other.

REQUIREMENTS OF FLOUR.

The first requirement of good flour is strength, which is measured by the percentage of gluten it contains. Then it must be white and practically free from grey and black specks. When pressed in the hand it acquires a soft, cushion-like form and adheres to the hand. When doughed it will be elastic and capable of being drawn out into thin layers, and will expand in the oven into a high, well piled, light loaf of white color and hold its form and size throughout the baking. A wheat that makes such flour is a good milling wheat.

BREAD.

Our next step is to see how this dough will act in the oven. The gluten and starch of flour cannot be separated by mechanical means; hence, bread contains them in the same proportion that flour does; but the percentage of water and dextrine are largely increased in bread. In doughing flour for the oven the baker adds yeast or leaven, which causes the gluten to ferment and liberate carbonic acid

gas which in passing through the dough causes it to become porous and to swell, or as we term it to "rise." We note then that it is gluten that causes dough to rise into a well piled loaf and retain its form and size in baking. Notwithstanding flour contains but 10 to 15 per cent of water, bakers bread contains as much as 40 per cent of water and army bread as much as 43 per cent, the water remaining in the bread whether fresh or stale, being in a modified molecular condition in stale bread. As flour increases in gluten, or as we say becomes stronger, its power for absorbing water and evenly expanding when doughed increases, and it consequently makes more loaves, which explains why bakers demand strong flour, and fixes in our minds the fact that wheat to be valuable to the miller must be rich in gluten, for strength cannot be milled into flour unless the wheat contains it. We have now followed wheat through its transformations from the field to the oven and are ready to consider what breeds, from the milling viewpoint, will most nearly meet milling requirement.

BREEDS OF WHEAT.

I have taken the position without hesitancy that gluten is the dominant factor in determining the value of wheat, and as the different breeds contain materially varying percentages and qualities of gluten, it will be clear why one breed of wheat is not commercially as valuable as another. As the miller and the baker determine the value of wheat and the time is near when the wheat of our state will be milled at home, it is of utmost importance to the producer to know and to cultivate those breeds that have the highest milling values according to the determining factor I have pointed out. We will now glance at our four chief breeds and measure them by this factor, beginning with

BLUESTEM.

As a milling wheat, no other breed we produce equals well matured Bluestem. It is the ideal of the Pacific coast miller, having good strength, excellent color, high grade gluten, choice loaf qualities, and yields well in milling and gives a rich, white offal. Without going further we would say Bluestem meets milling requirements on this coast, but up to the present its production has been so limited millers could not depend on getting it except in quantities about sufficient for domestic flour. I am cognizant of the statement that this breed of wheat will not mature well in all parts of the state, but I do not believe the statement, as a fact, is sufficiently substantiated to warrant resting without further effort to disprove it.

CLUB WHEAT.

Our next principal variety is Club wheat, which is a general favorite among millers and next to Bluestem more nearly meets milling requirements than any other breed we have. It grows to greater

perfection in the Big Bend than in most other localities, the sample from there commanding a premium over that from some other parts of the state. As grown there—and it is this sample we will base our estimate of Olub wheat on—it is a white wheat that makes a strong, white flour of Bluestem texture, and has good gluten and good baking qualities. It yields well under the rolls and makes from one to two pounds more flour to the bushel than Olub grown in some other localities. Elsewhere in the state Olub wheat is generally yellow and makes a yellowish flour which falls below the gluten requirement—two serious objections from the milling view. Since our greatly increased milling capacity, and the adoption of numerous breeds of wheat, like Bluestem, Olub is not produced in quantities sufficient to supply export milling demand; hence, millers are forced to resort to mixtures—often unfortunate ones—in order to get supplies.

HARD RED WINTER.

Hard Red Winter wheat, which has attained great popularity in Adams county as a winter breed, has considerable milling merit but is little used except as a blend with Bluestem or Olub. It has good strength and makes a flour of fair color. It gives a yield in milling about equal to Olub, but, unfortunately, it makes a deep red bran and shorts which, inasmuch as they are sold with the white offal of Olub and Bluestem, are much criticised. If the cow does not object to this red color, the fastidious buyer does, and backs his prejudice with a demand for a discount. Milling preference on this coast is entirely in favor of the white breeds of wheat.

RED RUSSIAN.

From the flour standpoint, this wheat staggers the miller. It is not and never will be classed with milling wheats. Nevertheless, I will enumerate some of its characteristics:

First—It has a very thick skin. Some millers claim it has two skins and have named it "Rhinceros Wheat."

Second—Of all our wheats it gives the poorest yield in milling, requiring three or four pounds more to a barrel of flour than Olub.

Third—It makes an exceedingly weak flour, falling 20 per-cent below the gluten requirement, and yielding a dark, ragged and inferior quality of gluten.

Fourth—It makes a dark flour of rancid flavor.

Fifth—It makes a flour of poor expansive qualities, the loaf inclining to sogginess and baking full of glazed air holes.

Sixth—It makes a deep red offal of poor quality.

It would appear as exceedingly unfortunate that so much attention is paid by farmers to a breed of wheat that is destitute of milling merit. We have outlived the time when it is profitable to grow a poor breed of wheat because it is a weed killer, and year by year as Red Russian is largely produced, the discount will become great-

er and greater until it reaches ten to twelve cents per bushel under Bluestem and even at this figure it is doubtful if Bluestem is not more economical.

MIXED BREEDS.

I mention mixed wheats in order to call attention to a danger that menaces the ultimate success of the wheat-grower in many localities where pure breeds of wheat are almost obliterated from alternating various kinds of white and red wheats on the same land. This practice is rapidly degenerating our wheat and if continued will inevitably lead to a bad end. It is common to find three or four varieties in the same sample, and year by year this grows worse.

From the foregoing it is apparent that the selection of proper breeds of wheat is of momentous mutual concern, both to producers and millers, but it is a matter susceptible of solution without seriously disturbing present practice.

TOO MANY DISSIMILAR WHEATS.

We have already seen that our millers are confronted with a serious drawback in not being able to constantly get any one variety of wheat in sufficient quantities for export grinding. They may base their orders upon Club or Bluestem wheats for which the mill has been clothed with costly silk, and in the midst of their operations they find they must change to other wheat for which their silk is not adapted, and which may seriously affect the quality of their flour. This brings us to the question of paramount interest under my subject:

WHAT BREEDS SHOULD WE GROW?

If it were decided that we are to have one breed and universally grow it, we would settle at once on Bluestem. But if we decided upon two breeds, as would probably be best, we would unhesitatingly say: Choose Bluestem and Club of the Big Bend character, which we have shown are superior milling wheats.

I am bold enough to state, as a firm conviction, that if this Club and Bluestem were universally grown in the state, the problem of a superior milling wheat would be solved and producers would be benefitted beyond anything they can hope for from some of the breeds of wheat they are now growing.

I am aware of the contention that if the wheats I have referred to be transported to localities now producing the weaker varieties, the result will be weak wheat. I also recognize that environment has much to do with wheat, and that in choosing sorts to be grown we must have in mind climatic conditions and adaptation to spring and autumn planting, yet I will venture the opinion that under the more scientific farming of today, if seed were carefully selected from the two breeds I have named, and planted generally throughout the state, in well cultivated land, they would flourish, and maintain for

years all of their characteristics in their new home, whether sown in autumn or spring or both. Even if the pure, strong breeds of white wheat should not produce exactly as much as some others, nor command as great a price when grown in one locality as when grown in another, still I believe the good results would ultimately be surprisingly greater.

Form exhaustive tests made elsewhere in which a strong and a weak breed of wheats were carried to other localities of similar climate and there cultivated side by side, the better breed in every instance asserted itself regardless of soil, and produced strong wheat, while the inferior breed produced weak wheat; each, however, retaining its characteristics for years. These tests conclusively prove that breed is the dominant factor in determining strength in wheat, and also bring out the fact that greatly prolonged use of the same seed on the same land always tends to serious degeneration.

If evidence were wanting that some of our leading breeds of wheat are degenerating, enough can be adduced from a comparative statement furnished by one of our large mills. The comparison is based on a run of four weeks made nine years ago and a run of like length this year. The seasons were alike, the wheat was the same breed, from the same locality, and all other conditions substantially the same, except that we are milling closer now than we did nine years ago. The run of the present year required three pounds more wheat per barrel of flour than the run of nine years ago, and fell three points, or 10 per cent below the flour of nine years ago in gluten. From this experiment we determine that the intrinsic milling value of wheat milled nine years ago is several cents per bushel greater than the sample milled this year. I anticipate one objection to my suggestion for restoring pure breeds of wheat of high commercial value, which practically limits us to Club and Bluestem, will be that neither are acknowledged winter varieties, and that autumn sowing is necessary. I answer this with the counter suggestion that those varieties now used for autumn sowing will winter kill, wholly or partly, about one year in three, which I daresay is as often as the Club wheat mentioned would be winter killed.

EFFECT OF SOIL AND CLIMATE.

Unless my position thus far is badly taken, the future of both growing and milling wheat will be under the guiding hand of science. Milling is no longer conducted upon guess work or theory but proceeds upon the accuracy of technical knowledge and chemical analysis even to determining the value of wheat. In laying particular emphasis upon breed of wheats as the dominant factor in determining strength, rather than attributing it to climate and soil, I have merely stated a fact that science has firmly established. It is, however, conceded that soil has a minor influence, and admitted that any wheat must be adapted to climatic environment, but neither climate nor soil will make a strong wheat out of a weak breed. If you

transport one of our weak varieties to some other locality where our stronger sorts grow, and there plant it, the result will be weak wheat and vice versa. If you bring soil, from Florida for instance, and plant in it one of our wheats, it will mature and maintain the characteristics of its breed, but if you transport the same wheat and plant it in the same soil in Florida, it may not mature for the reason it is not acclimated.

Inasmuch then, as particular soil is not an important factor in the proper development of kinds of wheat, and as the two breeds I have suggested are well acclimated in all our localities, it seems reasonable that with proper care in selecting seed and cultivating the soil they would thrive throughout the state and afford us abundant quantities of similar wheats of high intrinsic values, which would bring producers greater returns than they are now getting.

We certainly have drifted into a deplorable condition from the adoption of a multitude of dissimilar wheats, many of which have little or no milling merits, as well as from the prolonged use of the same seed without effort to maintain pure breeds in their full vigor.

SUM OF ARGUMENTS.

In conclusion, I sum up the points I have tried to bring out, as follows:

- (1) That the time has come when wheat must be chosen for its intrinsic milling value rather than for its reputation as a weed-killer.
- (2) That gluten is the dominant factor that determines the value of wheat or flour.
- (3) That quantity and quality of gluten are inherent qualities of breeds of wheat, rather than innate qualities of soils.
- (4) That wheats of high commercial value are rich in high-class gluten.
- (5) That of all our varieties Bluestem and Club contain the highest per cent of good gluten and most nearly meet milling requirement.
- (6) That under proper treatment those two breeds would flourish throughout the state and become our chief productions.

Following these two addresses the Convention was favored by a number of selections by the College orchestra. The excellent music, together with the presence of hundreds of students who packed the already crowded halls aroused the visitors to such a pitch of enthusiasm that acting on the suggestion of Hon. Oliver Young, the members rose to their feet and gave three rousing cheers for the college and its students. The latter responded with a sample of the college yell.

FACTORS INFLUENCING THE MILLING QUALITIES OF WHEAT.

By PROF. W. R. THATCHER, Experiment Station Chemist, State College.

Much has been said during this convention to emphasize the interdependence which exists between the grower, the shipper, and the miller of wheat. Our miller friends who have just spoken have presented their side of the question and would have our farmers believe that what is best for the miller is best for the wheat producer. We do not forget, however, that other factors and other uses for wheat than the making of flour may enter into the problem. It is not my province today to enter into a discussion of these, however, but to discuss with you the factors which influence the milling qualities of wheat.

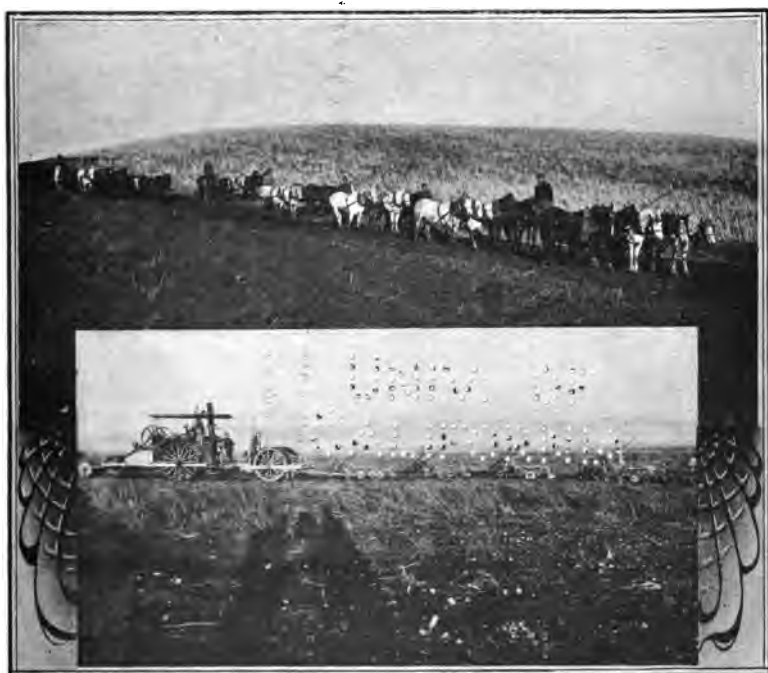
First of all I wish to lay down two fundamental propositions, namely, that the miller cannot put into his flour what is not originally present in the wheat and that he must put out a product which will meet the demands of his market. It may be true that some of the consumer's demands are based on prejudices alone, but they must be met or the miller loses his market. It would appear that the time is ripe for a campaign of education to do away with some of these prejudices, and I shall call attention to some of them in my remarks today, but until they are done away with we must recognize and submit to them.

The first factor in determining the milling quality of wheat is the chemical composition of the wheat itself. For the purposes of chemical analysis and to aid in estimating the food value of the material, the constituents of grains are commonly divided into five groups, or classes; namely, moisture, ash, crude protein, fats, and carbohydrates. It should be understood that these are not five separate and distinct bodies or things, but are groups of substances having very similar properties. Thus, for example, crude protein is the name for a general class of nitrogenous bodies of which the albumin or white of eggs, the mucin or lean meat of animal bodies, the gluten of flour, etc, are common examples. Again carbohydrates is the general name including a large number of substances such as starch, sugar, glucose, certain vegetable gums and the like. Now since it is the substances belonging to the protein group of the wheat kernel which gives rise to the gluten in flour and the carbohydrates of the grain which yields the starch of the flour, it is obvious that the percentage of these constituents in the wheat is one of the determining factors in its milling qualities.

That the percentages of these constituents may vary greatly in any given breed or variety of wheat is very well illustrated in the following table which shows the results of the determinations of the percentages of protein in some samples of wheat which I have been analyzing during the past few weeks. I might, of course, give the results of the whole analysis, but these figures for protein alone are



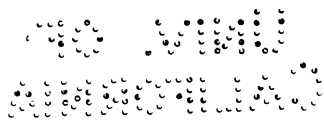
THE CENTENNIAL MILL, SPOKANE
ONE OF THE LARGEST IN THE NORTHWEST



TWO PLOWING SCENES

1. On Ranch of A. J. Stone, Rosalia

2. Steam Plow on Babcock Ranch



sufficient to illustrate the point which I wish to make in regard to the variation in chemical composition of wheat of the same breed or variety.

TABLE 1—PROTEIN CONTENT OF WHEAT

| VARIETY | NUMBER OF ANALYSES | PROTEIN CONTENT | | |
|------------------|--------------------------|---------------------|---------------------|---------------------|
| | | MAXIMUM PER CENT | MINIMUM PER CENT | AVERAGE PER CENT |
| Bluestem | 12 | 13.48 | 9.53 | 11.59 |
| Little Club..... | 5 | 10.76 | 8.87 | 9.87 |
| Red Chaff..... | 3 | 15.21 | 10.46 | 12.60 |
| Red Russian..... | 6 | 10.43 | 8.23 | 9.14 |
| Turkey Red..... | 3 | 14.17 | 10.31 | 12.51 |
| Jones Fife | 7 | 12.45 | 9.21 | 10.32 |

These figures show that, while certain varieties tend to contain higher percentages of protein than others there is greater difference between different samples within the same variety than between the averages for different varieties. I should add that included in the analysis from which these figures are taken are samples of wheats from nearly all the great distinct wheat producing districts of this state, representing very widely different soil and climatic conditions. This leads me very naturally to inquire what the causes of these variations may be. To answer this question thoroughly would require a for too lengthy discussion for the limits of this address. It will be sufficient to say that I have reached the conclusion, as a result of my observations and study of the matter, that the character of the soil, at least so far as its supply of plant food is concerned, has very little to do with these variations. I am aware that this statement may lead to controversy, but I am forced to this conclusion as the result of my investigations, and I would repeat that I believe that, except as it may influence the supply of moisture at critical stages in the plant's growth, the character of the soil has very little to do with the nature or composition of the grain which is grown upon it.

On the other hand, the climatic conditions, including moisture, temperature, and sunshine, have everything to do with these variations in composition. In order to make this point clear, I must call your attention to certain facts in regard to the growth of plants. Plants build up their protein matter chiefly while they are young and growing. As they approach maturity, say at about the time of flowering, they nearly cease building up this material and begin to transfer it to the head of the plant where as soon as the seeds are formed it is stored up in them, to be used in feeding the new plant which is to grow from the seed. At the same time carbohydrates, or in the case of the wheat plant, starch is being built up and likewise transferred to the storehouse in the seed. But the manufacture and transfer of starch appears to continue for some time after that of

protein has been practically completed. Therefore a prolonged period between the first formation of the seed and the final ripening of the plant will always result in a larger accumulation of starch and a consequently smaller proportion of protein. On the other hand any climatic disturbance such as a lack of available moisture or hot wind, which tends to hasten the ripening process shortens up this storage of starch in the seed with a resulting increase in the proportion of protein contained in it. This accounts for the fact which is well known among millers that shrunken wheat, which has failed to ripen thoroughly, is almost invariably rich in protein and produces flour containing a high percentage of gluten. In short, any climatic conditions which tend to shorten the time between the flowering and the final ripening of the plant will result in high-protein wheat and conditions which tend to lengthen the ripening period will result in starchy, low-protein grains. Unfortunately for the milling interests, it is just those conditions which cause plump heavy grains giving high yields per acre which result in low-protein grains. The problem which confronts the wheat industry of this state today is how to produce grains which under favorable conditions for long ripening periods will yet manufacture and store up sufficient protein to yield flour of high enough gluten content to make it desirable for bread-making purposes.

The second factor influencing the milling quality of wheats is the percentage of each of the several mill products which it will yield. While each of these products, namely, bran, shorts, middlings, and the several grades of flour, have a considerable food value and a definite market price, the flour is the product which commands the highest price. Therefore, the larger the yield of flour per given weight of grain, the larger will be the money return for it. It is the white starchy part of the seed, or endosperm as it is called, which yields the flour in milling. Hence, the miller can afford to pay more for plump, heavy No. 1 grain, containing a large portion of endosperm than he can for shrunken, light weight No. 2 grain, yielding a much larger proportion of bran and less of flour, although the flour may be considerably richer in gluten in the latter case. This factor, however, is too well-known and too generally relied to need further discussion.

The third factor I wish to mention is the distribution of the valuable constituents of the wheat to the several mill products. I can perhaps best illustrate what I mean by an example. In a recent chemical and milling test of certain durum wheats in South Dakota, Prof. J. H. Shepherd found that the proportion of the total protein present in the wheat which went into the bran when milled varied from 6 per cent to over 46 per cent with an average of about 25 per cent. In the one extreme case, in these experiments, almost half the protein of the wheat went into the bran, leaving of course a correspondingly small amount to be distributed among the other mill products and resulting in a flour of very low gluten content. From

this it is apparent that wheat of high milling qualities must not only possess large amounts of the desirable chemical constituents, but they must be so distributed in the grain that they will appear chiefly in the flour when the grain is milled. Of course, we admit that if they go elsewhere, into the bran for example, the latter will have a resulting very high feeding value. But this is not what we want in milling wheat, where, as I have pointed out, the flour is the critical product in determining the value of the manufactured material.

Fourth, the quality of the flour. We come now to the dominant factor in determining the real milling value of the wheat. What is it that distinguishes wheat from all other grains? Not its chemical composition as described a few minutes ago. For we often analyze samples of oats, corn, or barley, which show practically identical percentage of ash, protein, fats and carbohydrates as do these samples of wheat. It is very probable that many a southern corn hoe-cake contains just as much or perhaps more total nutriment than does an equal weight of white bread. Why are we willing to pay double or even triple the price for wheat flour that we would for corn meal of equal food value? Unquestionably it is because we like what we call "light" bread. Probably this is mere prejudice and that we might with equal or greater reason eat other grain products than "light bread." But this is a prejudice which will undoubtedly remain with us and which we may as well plan to cater to.

What is it then which distinguishes wheat flour from meals of all other grains and gives it this power to produce "light bread?" "Lightness" is due to imprisoned gas generated by the fermentation of starch by yeast, or produced from baking powders. This same fermentation of starch liberating bubbles of carbonic acid gas may be caused by yeast acting on starch in corn meal, but the corn meal dough will not become "light" because there is nothing there to imprison the gas. The substance which is peculiar to wheat flour is this tenacious, elastic material, called gluten, which serves to retain these gas bubbles. No other plant or seed but the wheat kernel has the compounds in it necessary to produce gluten hence we must always look to wheat for our supply of this important food constituent.

I do not wish to be understood to state that gluten is the only valuable ingredient of wheat flour. Starch is just as necessary a constituent and perhaps of even greater food value. But starch can be grown and supplied by many other plants just as easily and probably more cheaply than by wheat. If it were possible to grow a wheat so rich in gluten producing materials that it would contain an insufficient supply of starch to produce flour of proper baking qualities, this deficiency might easily be overcome by the addition of starch from some other source. But on the other hand if, as it is often the case, our wheat is too rich in starch and produces flour yielding too small amounts of gluten, there is no other possible source from which to get gluten to build up this lack and the flour must be poor in baking qualities. Hence it is that the amount of gluten yielded

by the flour is properly taken as the measure of the value of wheat for milling purposes.

But it is not alone the quantity of gluten produced which measures the milling quality of the wheat. The quality of the gluten must be taken into consideration as well. Gluten, as such, does not exist either in wheat or in flour. It is produced by the union of two protein bodies present in the wheat or flour when the latter is moistened or "doughed." I am aware that it is common practice to speak of "high gluten" wheat, or "low gluten" flour, etc, but strictly speaking this is incorrect. The protein bodies which will produce gluten when the mixture is "doughed" are included in the class already spoken of as crude protein, and are present in wheat and flour along with smaller quantities of other similar bodies, which, however, do not have anything to do with the production of gluten. The two proteins which when united form gluten, are known respectively as glutenin and gliadin. They are very different in character. Glutenin is a grayish, opaque, powdery substance, while gliadin is a yellowish, or brownish, nearly transparent, glue-like body. It is the gliadin which gives to the gluten the tenacity and elasticity which binds the flour particles and enables the dough to expand and enclose bubbles of gas which are generated by the action of yeast or of chemicals. The glutenin serves to fix the gliadin and to distribute it throughout the mass of dough, and without it the gliadin would tend to gather in sticky masses in separate portions of the dough. Hence the presence of a certain amount of each of these in the gluten is necessary. But it is apparent that any variation in the proportion of these will have very marked effect on the character of the gluten. Such variations are very common. It has been found that in any given breed or variety of wheat the proportion of gliadin to glutenin remains about the same regardless of the total amount of gluten present. But that as between different varieties of wheat the proportion of these in the gluten varies largely. Hence the quality of the gluten from two given samples of wheat may be very different, even though its quantity may be the same.

The presence of a large proportion of gliadin gives a gluten of light color, almost transparent, and of great tenacity and elasticity. An excess of glutenin on the other hand causes the gluten to be dark in color and to break apart very easily, thus losing its power to retain gas in the bread. Gluten too high in gliadin is undesirable since it gives very large holes in the bread surrounded with a glassy looking surface which is unpleasant. Hence the best quality of gluten must contain neither too much nor too little gliadin. A desirable proportion seems to be about 60 per cent of gliadin and 40 per cent of glutenin in the gluten.

Gluten may be separated from wheat flour by moistening a quantity of flour with water, working it into a smooth dough, and then holding the dough under a very gentle stream of water and kneading it gently until the starchy matter is all washed away. The gluten

will then remain in a ball of tough elastic "gummy" material. This is known as "wet gluten." The percentage of wet gluten in flour is commonly determined by taking a weighed quantity of flour and treating it as just described, taking care not to wash away any of the gluten, then when the ball of gluten is obtained, squeezing the surplus water from it and weighing it. This is the common method among millers of determining the gluten content, or "strength" of flour, a "strong" flour being one yielding a high percentage of gluten and a "weak" one yielding a lower amount. Now if this ball of wet gluten be placed in a drying oven at the temperature of boiling water for ten hours it will lose the moisture it contains and yield a hard, horny mass called "dry gluten." The relative amount of wet gluten and dry gluten from a flour is of importance since it indicates the amount of moisture which the gluten will hold, or the so-called "water holding capacity" of the gluten. Flours yielding gluten of low water holding capacity will produce bread which will dry out rapidly—an undesirable feature. Hence gluten of high water holding capacity is a very desirable constituent in flour.

The fifth and final factor influencing milling quality which I wish to mention is the color of the flour. Here I must admit that we meet with prejudice pure and simple. A very great number of experiments and analyses have shown that yellow or dark colored flour is as a rule just as nutritious and oftentimes yields bread of a better flavor and other more desirable baking qualities than that produced from the purer white flour. But we all know that not one in ten of our American housewives will use dark colored flour. And in general the whiter the flour and the bread made from it is, the better it suits the cook. This is unquestionably prejudice, but when our American woman sets her foot down and declares that she will have white bread or none at all, I for one feel that it will be hopeless for any miller or scientist to attempt to go counter to her wishes. Therefore, I fear that we must, at present at least, bow to the inevitable and recognize that color is a very important factor in determining the commercial value of flour and hence that the color of the flour is one of the essential factors influencing the milling quality of wheat.

This paper was discussed by Mr. M. Moriarty, Reardan, Mr. M. H. Houser, Pomeroy and others. Unfortunately notes of these remarks were not taken.

On motion a committee on resolutions was appointed by the Chairman as follows:

J. W. Arrasmith, Tacoma.

M. H. Houser, Pomeroy.

M. W. Whitlow, Pullman.

Adjournment was taken until 1:30 p. m.

At the opening of the afternoon session several committees were appointed after which the following papers were read:

INFLUENCES AFFECTING MARKETS AND PRICES.

By W. H. REED, State Grain Commissioner, of Tacoma.

"How much owest thou? And he said, an hundred measures of wheat. And he said unto him, take thy bill, and write fourscore." —The Dishonest Steward Parable; 16, St. Luke, 7.

Pretty much of everything affects the market price of wheat: A larger or a smaller prospective yield of the greater wheat producing countries, such as the United States, Russia, France, Argentine, India and Australia; a general rainfall in harvest time in any of these agricultural domains; the discovery that rust is devastating large districts, as in the northern middle west last season, which consequently took your eastern Washington wheat to help fill the capacious and rapacious maw of the giant Minneapolis mills; the advent of the festive grasshopper or the predatory chinch-bug and other like banes; an earlier than usual winter-closing of the Russian sea of Azov, and the Black Sea at Odessa, or of our own great lake ports which is always a precursor of an advance of the competing railroad's freight rates to the seaboard; the unexpected addition or reduction of the import duty on wheat by Germany, France, or to a minor degree, as in this present month, by smaller countries like Mexico and Brazil; the outbreak of a war, or threatening outbreak of one involving any extensive wheat producing or buying country; the murder of a ruler in any of them; the development of a monetary panic or money market stringency; the general prosperity or poverty of the consuming masses; the accidental or possible prearranged disposition of the producers to sell early, or to hold their grain; an official estimate on the crop of a nation or even of one of our largest wheat growing states, which is different from the prognostications. All of these and many, many other legitimate factors are constantly protruding themselves to affect the daily market price of wheat.

But the manipulators of the market price, not deeming these legitimate causes sufficient to work their ends, resort to illegitimate ones, of the bunco-game class. They send broadcast false so-called expert reports on the condition of the growing crop in any and all of the great wheat producing countries, and later like false reports of their yield. They send out misleading, alarmist reports of rust, drouth, rains, windstorm damage, and the like. This is done by all the great manipulators of wheat market prices.

Take these dishonest, highwayman's methods and add to them any factors from the legitimate list I have recited, and the might of the dollar in untold millions applied to the market as the Armour Grain company can and frequently does apply it, and all opposing grain dealers will be engulfed, for a period, by this dollar avalanche.

The grain dealer is a gambler, a gambler who plays his game more in the dark than his compatriot, the so-called by strange distinction, professional gambler. The professional gambler knows what cards are out, and unless he has been steered up against the Ah

Sin game he can figure out somewhat approximately the per cent of chances for his hand. But the grain man playing the market is always in an Ah Sin game, a game subject to all sorts of jugglery and chicanery, in which even the number of cards agreed on before the deal may be changed after the deal, as by the lowering or raising of the wheat grade previously stipulated—repeatedly done in Chicago—and attempted to be done in the famous Leiter corner; or by the villainous act in the Harper Chicago wheat corner which made all warehouses and all car deliveries regular for a distance of 150 miles in Illinois, whereas the game opened under an agreed limit of warehouses and cars only at and in Chicago.

The non-professional grain gambler can't foresee the coming day's weather freaks, the hovering war cloud, the fanatical Guitteaus, the dollarcataclysm which is about to be let loose upon him. The lights are always turned out when he plays. He knows not and cannot know in which direction his next step will lead him; his mental toes are frequently turned around where his heels ought to be—so whenever he wants to go north he goes south, and returns, poor man, with his pocket book under a drouth. Like Longfellow's boy, his ways are the wind's ways, and his thoughts are long-long thoughts. After the biding tragedy has risen to greet him—after he has been engulfed by the waiting cataclysm, and has had time to rub his eyes and look about, he wonders how the ocean happened to be placed so near the land.

It is estimated of the Chicago Board of Trade brokers that but 10 per cent of them escape failure. Now, mark you this—the man who deals in the actual wheat instead of paper wheat; who buys directly of you, the farmer, takes the same chances the option trader in Chicago takes when he holds that wheat for a change in the market tide, a tide having no regular ebb and flow with the moon, though it is generally, poor victim, a moonshine tide.

I pity the buyer, but I don't find in my pity any excuse for his resorting to illegal methods to acquire more than the legitimate risks of his business entitle him to. If he buys and holds he stands an equal chance of the market price advancing or declining. He flips his coin, and it may turn heads or it may turn tails—provided he has not loaded it, and if he has loaded it and is caught at it he should be made to pay the penalty fixed by man under the command which says, "thou shalt not steal." The grain buyer should play a square game. Because the buyer's business is a risky business is no excuse for lack of principle, negatively speaking; for rascality, positively speaking; no more excuse than there is for the poker player to be a short card gambler.

Having taken this general view of the influences affecting markets and prices, let us now get closer home; let us see where we get off—we farmers who live in a state so prolific that it is easier to grow wheat than not; where the profits of the farmer are so great that he can afford to let his money go regardless, be swindled regardless,

and where, all of a sudden, he "continues" to do nothing to protect himself.

All the foreign markets are our markets—we of the states of Washington, Idaho and Oregon. All the factors, legitimate and illegitimate, previously recited, affect the markets of the Pacific coast more or less, up and down, just as with those of Chicago. But we of this coast have not only these world wide illegitimate factors to bamboozle us, but have had added unto us a special batch to fit our environment. The sack cinch is one of these we are ridden with. That, however, is not used everywhere throughout the Pacific coast, but it is confined to the farmers of the Northwest Pacific—Washington, Oregon and Idaho, who are not buckers—that is, not yet, but they are going to be, I believe. In California all wheat is paid for on gross weights without any deduction for weight of sacks. The exporters there and likewise all along this coast sell the wheat abroad under their regular printed contract which says "sacks shall weigh as wheat."

There is not a scintilla of excuse for making a sack dockage of three-fourths of a pound in Portland, Tacoma and Seattle, and of one pound by the interior buyers, but the sole excuse of greed. Until the Isthmian canal is completed all shipments to Europe from the Pacific coast must be made in sacks, the exporters say, to avoid the shifting of cargoes and heating of the grain in the four months' trip to Liverpool around the Horn. I don't agree with them that it is necessary for this coast to ship only in sacks. I believe that we can successfully ship in bulk—for it has been demonstrated that we can. That, however, as Kipling would say, "is another story." But nevertheless, for the reason stated, it is pure—or rather impure graft to deduct from the farmer under the present cargo system any weight whatever for sacks. On his crop, in the state of Washington, this year alone, it amounts to \$105,000. The way to defeat this imposition is for the farmer to handle and sell his wheat in bulk, just as Mr. W. H. Richardson, of Columbia county, has been doing. The mills can more conveniently handle it in bulk than in sacks. The interior and terminal warehouses can and will convert themselves into bulk warehouses, if so required by the trade movement. The Farmers Grain & Supply Co.—by the way a right good organization for the farmer—has already three bulk warehouses.

If the terminal warehouses sacked the grain the farmer would, on this year's crop, save the following items on sacks:

Sack importers' profit, \$70,000; sack freight to Eastern Washington, \$105,000; profit to the Eastern Washington sack dealer, \$70,000; freight on the sacks containing grain back to tidewater, \$22,000; add the sack weight dockage graft of \$105,000, and you have a grand total of \$372,000 that might be saved in one year. Is the Washington farmer so plethoric with money that such an amount isn't worth his saving? When the Isthmian canal is finished, cargoes then will certainly not go in sacks and he can then save that



SEEDING ON A LARGE FARM.



PLOWING.



STEAM PLOW

CHARACTERISTIC SCENES IN THE WHEAT COUNTRY

— 4 —

1919

amount plus the cost to the importer of sacks, say 5 cents each, or on 14,000,000 sacks, \$700,000 more, making a grand total of \$1,072,000 in a single year. But in the meantime, during the next ten years while the canal is building, why not save the \$372,000 a year, making \$3,729,000 in these ten years?

This year the Pacific coast farmer has two combines in the successful operation of bleeding him. The first leech is the vessel combine. A combine organized by the European vessel owners for the Pacific coast grain trade. They fixed their charter rates for all but French ships, to the United Kingdom, Havre, Antwerp or Dunkirk, from Puget Sound at 26 shillings and 3d; from Portland at 27 shillings and 6 d.; from San Francisco 22 shillings and 6 d. A French vessel with its government bounty, working in unison with this combine, has a 25 shilling rate from Puget Sound. If this vessel combine did not exist this same French vessel would certainly accept of 22 shillings; for a free lance French vessel was recently chartered from San Francisco for the United Kingdom at 17 s. 6d. or 5 shillings below the combine rate there. The difference between a charter rate of 26 s. 3. d. and 22 s. on a long ton is 2 $\frac{3}{4}$ cents a bushel. This is the farmer's loss not the buyer's. The farmer always pays the charter rate.

There is no way for the farmers to defeat a vessel combine excepting by combining and holding back their grain. But why suggest that? Farmers never combine and stand by it. Hod-carriers, barbers, street-graders, boot blacks, all other classes do. Farmers never. I have farmed, myself, in this state for 24 years and I know. I have fought the farmers' fight on freight rates, land grant, wheat grades, and wheat prices off and on for all these years and I know—they never pull together; always some will balk, others rear and kick, part "gee" and part "haw." To change the metaphor, they never fly in flocks. Here and there one flies and tries to save his mates, but they will stand flapping their wings, perhaps, or apathetically await a pot shot. A farmer ought to know how a bird feels, only more so, for he is always being shot at.

The second combine that the farmer has run against, and been bumped against hard this year in Washington, Oregon and Idaho, is the Portland-Tacoma-Seattle grain buyers' combine. It matters not whether the Portland end of that combine buys your wheat this year or the Puget Sound end: the price is the same, for all that the charter rate is lower on the sound.

Take a glance with me through this combine's compact, of which I possess a copy.

It provides that the Portland committee and Puget Sound committee shall meet every morning and fix the price limit for all members of the combine. That is a declaration of the elimination of competitive buying. A declaration of brigandage; its object being to get for its members that which does not belong to them—which a competitive market would not permit them. It says, in effect, that

the exporter who has secured low charter rates must not pay the farmer more than the less successful exporter who had to pay higher for his vessels. It says that the exporter who has made a fortunate sale in South Africa, China, Japan, in France or Mexico, shall not pay more than the less fortunate dealer. It says, that though the normal charter rate is about one cent a bushel higher in Portland than on Puget Sound that the God-given advantage of a better harbor there, shall be wiped out; and that the Puget Sound exporter is pledged thereby not to pay more than the Portland exporter. Thus it nullifies the act of God, and the act of man, for the United States courts have repeatedly held that a combine is prohibited by the Sherman act and by the common law, because a combine is so permeated with inherent potentialities for harm doing that it is wrong per se. This buyers' combine is going to be destroyed in the courts, I trust and I believe.

Strong under this brigand compact, their greed went farther than general prices and they made forays for more loot. They followed the pirates' "good old plan of taking all they had the power, and keeping all they can." So they provided in their compact that the minimum discount on smutty wheat should be five cents, with a maximum discount of twenty cents; and where wheat has "any indications of smut on the ends of the berry it shall be classed as smutty," they agreed.

Before the rallying of this combine for this raid these same men, for years, had charged a discount on smutty wheat of three to four cents, and where the grain was but slightly smutty they had charged no discount whatever. The great mills of Minneapolis made a discount of but two cents from No. 1 price on hundreds of cars of your smutty wheat shipped them last season. The state grain commissioner has a letter from the Northwestern Consolidated Milling company of Minneapolis saying that smutty wheat sent them "would require a dockage of from two to three pounds for washing if badly smutty and wheat not very bad would require about one pound for scouring." Facing this evidence I ask you: If a charge of 5 to 20 cents discount on smutty wheat is not a graft, what would be the limit constituting a smutting graft?

Another of this combine's incursions enforced a discount of $1\frac{1}{2}$ to 2 cents a bushel below their daily flat bluestem price of all wheat from the Walla Walla district graded "bluestem red mixed," in spite of the proof given them by the Washington state grain commission that the red therein was more valuable in gluten than the bluestem itself.

A further predatory round up was the making of a flat discount of 4 cents a bushel on all Red Russian wheat, and an additional discount of 1 to 2 cents if it tested less than 58 lbs., although their flat discount of 4 cents had in itself been a supposedly full discount for the inherent qualities which made that type of wheat by nature test light.

Quite enough, don't you think, to satiate their pillaging? Not so, however. They made an invasion into the Palouse and Clear-water districts, and issued the command that all their red wheat shall be discounted 4 cents from club prices. Thus to plunder on all this red wheat had no warrant but the right of might, the right of brigandage.

Even this endemic looting did not suffice them. They plead with the state grain commission not to fix the test weight for No. 1 at less than 59lbs., for the heavier the wheat tested the more it was worth, they said—and that part was true; and the more they would pay for it, they said—and that part was not true. Though by their own words they were committed to paying more for the heavier testing wheat this combine compact stipulated that they must not pay more for it. Do other bandits keep their pledges less?

These things these men do unto you, farmers. Don't do likewise you unto them, but see to it that they don't do you, hereafter. Get what's due to you—no more; get your own, not theirs—your own. See to it that you have a square deal. You can—why shouldn't you?

Now, I am going to drop away from this combine influence affecting markets and prices and talk precaution to you, and, I hope, into you.

When the exporter buys your wheat he doesn't take your weights. Does he ever? They'd do a stupid, unbusinesslike thing if they did. But you take theirs. Why? When the exporter sells abroad, or in Port Costa or elsewhere, the buyer from him doesn't take his weights. They both, the seller and the buyer have representatives to oversee the weighing. They'd do a stupid, unbusinesslike thing if they did not. Don't you farmers think you'd better follow their example? Mind you I'm not saying that the Puget Sound warehouse men and exporters are weighing your wheat short. I want it distinctly understood that I am not here claiming that they do. But why should you take their weights if they won't take yours, or any one's else? Is there any good reason why you should be more trusting of them than they are of you? Wouldn't it be common, every-day business prudence on your part to have your weights protected? Not because you suspect the buyer does weigh false, but because ordinary business discretion, plain common sense would naturally see to arranging for weighing supervision—or rather for disinterested weighing, just as the large shippers of cattle do; just as the shippers of ore to the smelters do. Because the present method is unbusinesslike you farmers should see to it at the next session of the legislature that this state is provided with a state grain weighing law. One can't tell what might possibly happen without such a law. Let us suppose that some of the buyers in California were to become buyers on Puget Sound. I'm not saying that the buyers of grain in California are all dishonest weighers. Do you know what happened in California? Not on Puget Sound, mind you. Not in this state, you understand.

In the suit there, last June, brought by E. Olemens Horst against the Howard Warehouse Company and Balfour, Guthrie & Co., charging short weights and "bleeding" of grain sacks, the jury brought in a verdict of \$4,771.87 against the defendants—and defendants paid it. It was proven in that suit, to the satisfaction of the jury, that there was a systematic tribute levied by the warehouses there. Mr. Horst proved to the satisfaction of that jury that many of the warehousemen of that state deliberately robbed the owner of the grain by under-weighing the grain when it came into the warehouse and over-weighing it when it went out of the warehouse. He proved that the warehouse gained and its patrons lost about a ton on every 1500 sacks of grain stored. It was proven there that the warehouse had a practice of "bleeding" sacks of grain where the normal leakage was not rapid enough to suit the warehouse. "I have found out," testified Mr. Horst, "that fraudulent weights are habitually returned by nearly every warehouse around the bay, and I have figures to prove it."

Do I bore you? Would you mind hearing of one more instance—down there in California, not Puget Sound, remember. We have seen that the Grain Buyers' Combine of Portland and Puget Sound is an Inter-state—I mean Inter-Grab Co., organized by obscure but honest grafters to farm-the-farmer, but I'm not claiming they are short card—I mean short weight men. We are talking now of California dealers and their methods, keep in mind. In 1903 in the case of Eppinger & Co., warehousemen, grain buyers and exporters, it was proven that it was their practice for years to swindle both the farmers and the shippers or buyers of wheat. This stealing was practiced by them systematically. One branch of the steal included the use of drilled scale weights. Small weights were sufficiently drilled to reduce the result, when they were used, 5 pounds, while the larger weights reduced the result 10 pounds. The farmers' weighing loss was made to run two pounds on a sack; in shipping out to points like South Africa, where the buyer was unprepared to reweigh, the consignees were much more largely defrauded in the weights. Because of these and other thefts by Eppinger & Co., Jacob Eppinger, the head of the firm, was indicted by a California grand jury July 17th, 1903.

Eppinger & Co. also had been doing a warehouse and grain buying and selling business in that year and previous years, at Portland and Tacoma. Had any of you heard of this doing down in California?

Way back in the years between 1665 and 1680 a man named John Wilmot wrote a singular verse; he said:

"'Tis a very good world that we live in:
To lend, or to spend, or to give in.
But to beg, or to borrow, or to get a man's own,
'Tis the very worst world that ever was known."

It seems to be revelant to the present day, somewhat, somewhere, —in California perhaps! Not in this state, mind you.

DISTRIBUTION OF THE WORLD'S WHEAT.

By PROF. W. G. BEACH, of State College, Pullman.

Three main factors are to be considered in studying the distribution, at any period, of some main portion of the world's food supply, such as wheat. One factor is the custom and capacity of various peoples for consumption of such a supply. This is a matter of the number of the population, of its purchasing power, and of its habits in reference to the use of the food in question. The second factor is the extent and location of areas suitable to the production of the article in question. In this connection must also be considered the knowledge, habits, and economic ability of the people of such areas, in production. The third factor has to do with the bringing together of the first two factors; that is, the transport and marketing of the supply, and the conditions determining the price. This third factor is not discussed here, but the attempt is made only to suggest a few important considerations in regard to the consumption of the world's wheat, and in regard to the present and probable regions of supply.

In an early age of the world's history each little continent grew its own food supply. There was no surplus for exchange. There was no communication of one region with another. Such was the condition in the early English village. Each community was self-sufficient. Gradually as towns grew up and industrial activities were separated from agricultural, a surplus of food was produced in the area immediately surrounding a town for the support, through the exchange of the town population. Later than this a whole province comes to be looked upon as a unit of production and consumption. The grain of a considerable territory might be transported to the various towns and cities of the province, but might not be taken out of the province, and grain from neighboring provinces might not be brought in, at least without the payment of heavy tolls. This condition is, for instance, found in France in the 18th century. It was but a step further to extend this idea to a whole nation or country, as districts became unified into nations and the national idea became dominant. A nation is then supposed to be self-sufficient in regard to its food supply. Internal commerce distributes the grain from one end of the kingdom to the other, famine in one district while plenty exists in another, no longer is found—a condition which constantly prevailed in the older provincial economy. But the country as a whole takes what measures it deems wise to prevent foreign trade from interfering, through cheapness, with the grain production of its own people; and also takes measures to check what is

considered excessive exportation. This is still the policy, roughly, of many nations, and until a century ago was the ideal of all European countries.

But a new factor has entered the problem. The growth of population entails an increased demand for food, and as wheat is the most important food stuff in the western world, this is equivalent to an increased demand for wheat by countries whose populations are increasing. The past century witnessed a great increase in population, and that rapid increase is still going on, though checked in places, as in France. The countries in which such changes have taken place are those in which manufacturing and commerce have developed. With the growth of manufacturing, arises a necessity for a large amount of labor gathered in dense groups, far larger and more densely congregated than could exist under agricultural conditions. The question then has to be asked, can countries with such increased population, countries which have become manufacturing centers, continue to supply their own bread? Or is it wiser to use their manufactured products to buy a wheat supply from countries which have a surplus over the needs of their own consumption? This latter, of course, is the position taken by England, and is the position which is, in part at least, being forced upon other countries of western Europe.

What then are the countries of heaviest relative population and which use wheat as food?

We naturally turn to England first. The population of England in 1801 was 9,187,000.

Her population today is 41,000,000. With such an enormous population to feed England has given up the effort to raise her own grain. She has been criticised for this and there is room for argument, but for the purpose in hand it is enough to accept the fact. The United Kingdom needs from 240,000,000 to 250,000,000 bushels of wheat. She raises only from 40,000,000 to 50,000,000 bushels. The change from a position of growing her own grain to that of purchasing her main supply has really been a gradual one. As late as 1870 she produced 120,000,000 bushels and imported but 64,000,000. Since that date the change has been very rapid, as is shown by the fact that there has been a falling off of wheat acreage from 3,760,000 in 1870 to 1,740,000 in 1901. This makes clear that England has definitely given up the idea of growing her own wheat. She is now the nation using far the largest part of the world's wheat surplus.

If we turn to France we note that in 1870 she had a slight surplus over her own needs. At the present time she still comes near to supplying her own wants, using a protective tariff of about 36½ cents per bushel to keep up this supply. The condition is a stationary one. The crop of 1872 was 332,000,000; that of 1900 was 326,000,000.

Germany in 1875 produced 100,000,000 bushels and was able to export a part of this. Since then she has moved forward rapidly as a manufacturing nation and her population has increased accordingly. The result is that in spite of the aid of a protective tariff and an increased production over thirty years ago, she must import a considerable quantity of grain. In 1900 her crop was 141,000,000 bushels and she imported about 50,000,000 bushels in addition.

Thus it is clear, so far, that England, as the great wheat importing nation makes no attempt to grow her own supply, while France and Germany are still following the policy of self-support. France with success thus far, because her population is now a stationary one; Germany unsuccessfully since her population is at present a rapidly increasing one.

A similar examination of other European countries would be equally well worth while. But it is sufficient to say that excepting Austria-Hungary and Roumania (I leave Russia for later consideration) the remaining European countries are consumers of as much or more wheat than they produce, and the surplus of the two exceptions is not of the greatest importance; while certain of the countries, as Belgium and the Netherlands, consume a far greater supply than they produce.

| | CROP | CONSUMPTION | EXCESS CONSUMPTION |
|------------------|-------------|-------------|--------------------|
| Belgium | 12,000,000 | 52,000,000 | 40,000,000 |
| Holland..... | 4,000,000 | 24,000,000 | 20,000,000 |
| Italy..... | 150,000,000 | 175,000,000 | 25,000,000 |
| Switzerland..... | 4,000,000 | 20,000,000 | 16,000,000 |

The above figures are estimated.

Of other countries of the world having large populations, mention may be made briefly of India, China, and Japan. Of these, India is a wheat-raising country, and has, at times, had a considerable surplus for export. But this surplus seems somewhat fixed as to its maximum, and is probably likely to decrease. There is, apparently, somewhat of an increase in the wheat-using habit among the people, and this is of considerable consequence in limiting a country's export surplus. It does not, at least, seem probable that India will greatly increase her exports.

In 1891 India exported 56 million bushels; passing over famine years, in 1899 she exported but 17,000,000 bushels; in 1901, 13,000,000 bushels; but in 1904 again, as in 1891, exported more than 56,000,000 bushels.

China and Japan are practically non-wheat-growing countries. Japan is becoming a wheat-consuming country, but because of her dense population, intensive cultivation of the soil, and proximity to large wheat-producing countries, will never grow a large part of her own supply. China is becoming more slowly a wheat-using country, and possibly will adopt the habit in time, though the very low average income is against this supposition. How much of its own supply

it can ever raise is entirely problematic. China proper will always—assuming that the wheat-using habit becomes established—consume more than it can produce. But in its dependent provinces, Manchuria, Mongolia, Thibet, the wheat growing possibilities may prove large, particularly in Manchuria.

The world's wheat surplus is about 400,000,000 bushels, of which the main part goes to Europe. Where does this supply come from? Four countries claim attention: The United States, Russia, Argentina, and Canada.

The United States at present furnishes the largest individual part of this European import. For some years, roughly speaking, we have supplied to the United Kingdom about 50 per cent of the 200,000,000 bushels which she purchases annually in addition to the 40,000,000, or more bushels which she produces herself. Besides this, some 10 per cent of our export has gone to Germany, 9 per cent to the Netherlands, 5 to 6 per cent to Belgium, and smaller quantities to Switzerland and elsewhere. Until not many years ago our great competitor in furnishing this European supply has been Russia. More recently, however, she has fallen behind and other competitors have come to be looked upon as more threatening. This change is apparent if it be noted that in 1870 Russia supplied England with 32,000,000 bushels, the United States sent her 16,000,000, Canada 3,000,000, and Argentina none at all; while in 1900 Russia sent England 8,000,000, Canada 14,000,000, Argentina 34,000,000, and the United States 108,000,000. Nevertheless the simple statement of such statistics should not lead to too absolute conclusions. It should be remembered that in European Russia large and, in one case, almost complete failure of crops greatly affected Russia's export supply; this is possibly a temporary condition only. Again, because of the increasing burden of taxation, impoverishing the peasant so that he cannot care for and till his land as it should be done, joined to the fact of the peasant's ignorance of farming methods, the production of Russia's famous and extensive wheat area has fallen off 30 per cent in 40 years. This condition is more serious than that first mentioned. But still it must not be forgotten that Russia has an immense wheat territory of wonderful natural fertility; that these lands are constantly passing into the hands of a new and intelligent middle class, which uses modern and scientific methods in restoring the land to its original productive powers; that the general diffusion of agricultural knowledge even among the peasants is now only a matter of time, as Russia is being opened to the influence of western Europe. Temporarily, and in particular because of the great political and social upheaval of the present, there may be a decrease rather than an increase in Russia's wheat production, though the heavy burden of taxation will compel the peasant to sell rather than consume his wheat, even to the verge of starvation, in order to meet the demands of government. But there is strong reason to believe that in the not far distant future there will be a notable increase in the yield



HEADING OATS

| Condition | Control (%) | Mild (%) | Severe (%) |
|-----------|-------------|----------|------------|
| 1 | 65 | 65 | 65 |
| 2 | 70 | 75 | 70 |
| 3 | 75 | 80 | 75 |
| 4 | 80 | 85 | 80 |
| 5 | 85 | 75 | 70 |

per acre over hundreds of miles of that wonderful wheat land of Russia, called the finest wheat land of the world.

Offsetting this increase is the fact, however, that Russia is developing great manufacturing centers; city populations are fast increasing; an industrial revolution is going on. This means a rapidly growing consuming capacity on the part of her own people, and the consequence is that the probable increase in the yield per acre will be absorbed by her own growing needs.

Turning to Russia's Siberian possessions different conditions are found, and greater results may come from this immense stretch of what was once thought to be barren land than we are willing to believe. The very rapid migration from European Russia to Siberia in the past two years is an indication of the opportunities which men are finding there. For the six years preceding 1903 about 200,000 persons migrated annually. At present the population is about 9,000,000 but a vastly greater population than this can be supported there. The agricultural region stretching from the line of the Urals to the Pacific, and from 100 to 300 miles wide is divided into 5 districts. The district just east of European Russia known as Western Siberia, contains a large amount of fine agricultural land, a considerable part of which is already occupied by Russian farmers. Wheat is the great crop of the district and reaches 50,000,000 bushels. Better methods of farming are used than in European Russia. The land is fertilized, American tools and machinery are in use, and the farmer is more progressive in every way. Transportation facilities have been poor, and to an American would seem so still; but the building of the line of railway from Perm to the Northern Dwina river emptying into the Gulf of Archangel, gives a comparatively short railway and long water haul of the wheat going to England and greatly reduces the transportation cost. In this district about 12,150,000 acres are in various cereals at present. The next district eastward, that of Central Siberia, is not so favorable for wheat growing, in that the climate is colder and the possible acreage is not so great; but a considerable quantity of wheat is grown, and where the land is suitable at all it is very fertile. Farther eastward is the district of Yakutsk—the region of the Lena river. Here is a district with a great acreage—unknown in extent as yet, but so far barely touched; similar in climate to Manitoba, yielding, where tested, large crops of wheat of fine quality. The soil compares favorably with the best land in the famous Russian "Black Earth" belt, the first wheat land in the world. The Amur district comes next. A third of it is open to colonization and will grow wheat. Some writers think that it offers greater possibilities in this line than any other section of Siberia, but opinions differ in this matter. Finally going westward again, we have the great Stepes south of central and western Siberia in which wheat is grown in all the valleys wherever tried and wherever there is sufficient water. If we were to add to this the great Russian territories of Trans-Caucasia and Central Asia, of which

there is not time to speak, we find a production of 90,000,000 bushels grown on the merest fraction of the available area of Russian Asia.

In a general way it may be said that while the wheat yield of Siberia is not large at present as compared with that of several other countries, the possibilities, as population increases and transportation facilities improve, as they are bound to do, are beyond estimation. The population now, except in Western Siberia, is extremely scanty, but migration has just begun.

The climate is cold, but no colder than most of central and western Canada. For the immediate future no great change in the amount of wheat produced need be looked for; but in the course of years this condition is certainly to change, and unless the large probable increase is absorbed by the growing demand of European Russia—so good an authority as the scientist Prince Tropicin thinks this will be the case—a considerable surplus will find its way over the Trans-Siberia railroad to the Pacific, where it will compete with American and Canadian wheat for the markets of Japan and China.

In 1872 England imported about 75,000,000 bushels of wheat, of which much the largest portion coming from any one country was 33,000,000 bushels from Russia. If we pass over a third of a century we find that a great change has taken place. Russia no longer holds the first place in supplying the wheat needs of the United Kingdom, nor even the second or third place. In 1900 the United Kingdom imported somewhat less than 200,000,000 bushels of which the largest amount (108,000,000 bushels) came from the United States. The second largest amount (35,000,000 bushels) came from Argentine Republic, while Canada held the third place with 15,000,000 bushels. The appearance of Argentina as a great wheat exporting country is a matter of great importance, in reference to the world's wheat supply. It was not until 1884 that Argentina had a wheat surplus to export, and not until 1890 that its export amounted to as much as 10,000,000 bushels. Since then it has advanced rapidly as an exporting country until it is now the greatest rival of the United States in supplying the markets of the world. In 1904 Argentina exported 80,000,000 bushels.

While no one can say what the future possibilities are, it is agreed by various students of the situation that the future of Argentina in this respect is of the first importance. It may be noticed that the cultivated wheat acreage of the United States in 1900 is given by the census as 52,588,000 acres. The wheat area under cultivation in Argentina is estimated by the agent of the U. S. Department of Agriculture at 8,893,000 for the years 1901 and 1902. How much more land is fit for wheat cultivation is of course difficult to know. An Argentine authority quoted by the Department of Agriculture says: "there are more than 80,000,000 acres in the Republic that could immediately be devoted to successful wheat farming if we had the farmers to do it." The Argentine Department of Agriculture estimated that 50,000,000 acres in addition to the amount already

under cultivation will ultimately be used for wheat raising. Even assuming considerable exaggeration in the estimates made there can be no question that far larger supplies of wheat may be counted upon in the future than Argentina has yet given to the world.

It is to be noted further that this wheat region is singularly favored by water transportation, being largely tributary to the La Plata river or its branches. Railway transportation is also well advanced. On the other hand lack of suitable labor is a serious drawback. Large colonies of European immigrants from Germany, Austria, Russia, Italy, Spain and elsewhere are scattered over the land. Far the largest number of these come from Italy, and while ignorant, are workers. Far too many of them, however, are "birds of passage," staying in the new country but a short time, often only a single season and then returning to Italy. In spite of immigration, however, the amount of labor is very inadequate.

Argentina, like Russia, has a vast body of wheat land and a suitable climate, as has the United States. The feature which makes a sharp contrast between the United States as a wheat raising country and these two which we have been considering is that while Russia has a large body of utterly ignorant labor, and Argentina has a very scanty supply of labor and that largely ignorant, in this country the supply of agricultural labor is large and intelligent. The importance of this contrast is very great.

One other country must be briefly considered, because of its importance in relation to the world's wheat; that is Canada. Within a few years Canada has, like Argentina, moved forward rapidly. So late as 1900 the wheat crop of Canada reached only 54,000,000 bushels, considerably less than half of which came from Manitoba and the other northwest provinces; while the crop from the latter sections for 1905 reached about 90,000,000 bushels. The migration into the country for the past few years—particularly into the northwest provinces—has been remarkable, a considerable part of it being from the United States. In 1902 the total immigration to the Canadian Northwest was 67,000, of which 26,000 came from the United States. In 1903 49,000 went from the United States out of a total of 128,000; while in 1904 the migration was 45,000 out of 130,000. Here is sufficient indication that Americans are convinced that there is a great future for this new land; and it is this newly settled part of Canada that is to furnish her portion of the wheat surplus needed to feed the ever growing demand of Europe, and the probable future demand of the far east. The Winnipeg Grain Exchange (Consular Reports Nov. 1905) estimates that the cultivated wheat acreage in the Canadian Northwest for 1905 is 4,150,000 acres which is 20 per cent larger than the acreage of 1904. At this rate of increase the year 1910 will see 8,580,000 acres under cultivation and at an increase of 19 bushels a total crop of 163,000,000 bushels. The yield has also been notable, reaching from 35 to 50 bushels per acre. Prof. Mavor of Toronto in a report to the British Parliament gives four es-

timates of the possible wheat crop of this region. These are estimates of different agricultural authorities in Canada, and vary from 254,000,000 to 1,000,000,000 bushels per year. Prof. Mavor himself accepts the estimate of 357,000,000 bushels, but this has been attacked by other Canadian authorities as far too low.

Railway facilities are as yet inadequate. The fact that new lines are either projected or under construction is evidence of the confidence of capitalists in the development of the country. The proposal of a line to Hudson Bay, thereby shortening and cheapening the transport to Liverpool, provided navigation of Hudson Bay for the necessary length of time (90 days) is possible, is a matter of great interest among many of the projects that are under consideration.

Pausing at this point, it may be concluded that a survey of the wheat needs of the world, as well as a survey of the opportunities for further production, lead to a feeling of confidence that for a long time to come, at least, the wheat crop will be sufficient to meet the world's demand.

This paper completed the prepared program and the convention proceeded to the transaction of business. Mr. J. D. Armstrong on behalf of the millers and shippers offered to pay all the expense necessary to publish the proceedings of the convention. He was given the thanks of the convention for his liberal offer.

By resolution the convention placed itself on record as favoring the handling of wheat in bulk rather than in sacks.

Report of Committee on Organization.

The report of the convention on organization was as follows, and on motion was adopted:

Your committee appointed to report on the question of the organization of a Grain Producers, Shippers and Millers Association, presents the following report:

1. We recommend that such an organization be formed to be known as the Grain Producers, Shippers and Millers Association of Washington.

2. We recommend that all persons resident in Washington engaged in the growing, shipping, milling and exporting of grain and grain products be permitted to enroll as members of said organization under such rules as to fees as the Association may determine.

3. On the adoption of this report we recommend that a temporary organization be formed to hold office until the next annual meeting, said officers to consist of a President, Vice President, Secretary, Treasurer and three directors to constitute an executive committee.

4. We recommend that a committee be appointed to draft a constitution and by-laws for the permanent government of the Association which report shall constitute the first order of business at the next annual meeting.

5. We recommend that the time and place of the annual meetings be held at the State College of Washington at such time during the month of January of each year as the Executive Committee may decide.

Committee { E. E. Elliott
O. E. Young
M. W. Whitlow

Election of Officers.

On motion the convention proceeded to the election of officers as recommended in the report just adopted.

The following officers were elected:

President—R. O. McCroskey, Garfield.

Vice President—A. J. Stone, Rosalia.

Secretary—S. O. Armstrong, Colfax.

Treasurer—M. H. Houser, Pomeroy.

Executive Committee—E. E. Elliott, Pullman, J. T. Bibb, Tacoma, J. W. Frye, Davenport.

The committee to draft a constitution and by laws for the permanent organization were as follows: O. E. Young, S. O. Armstrong, E. E. Elliott.

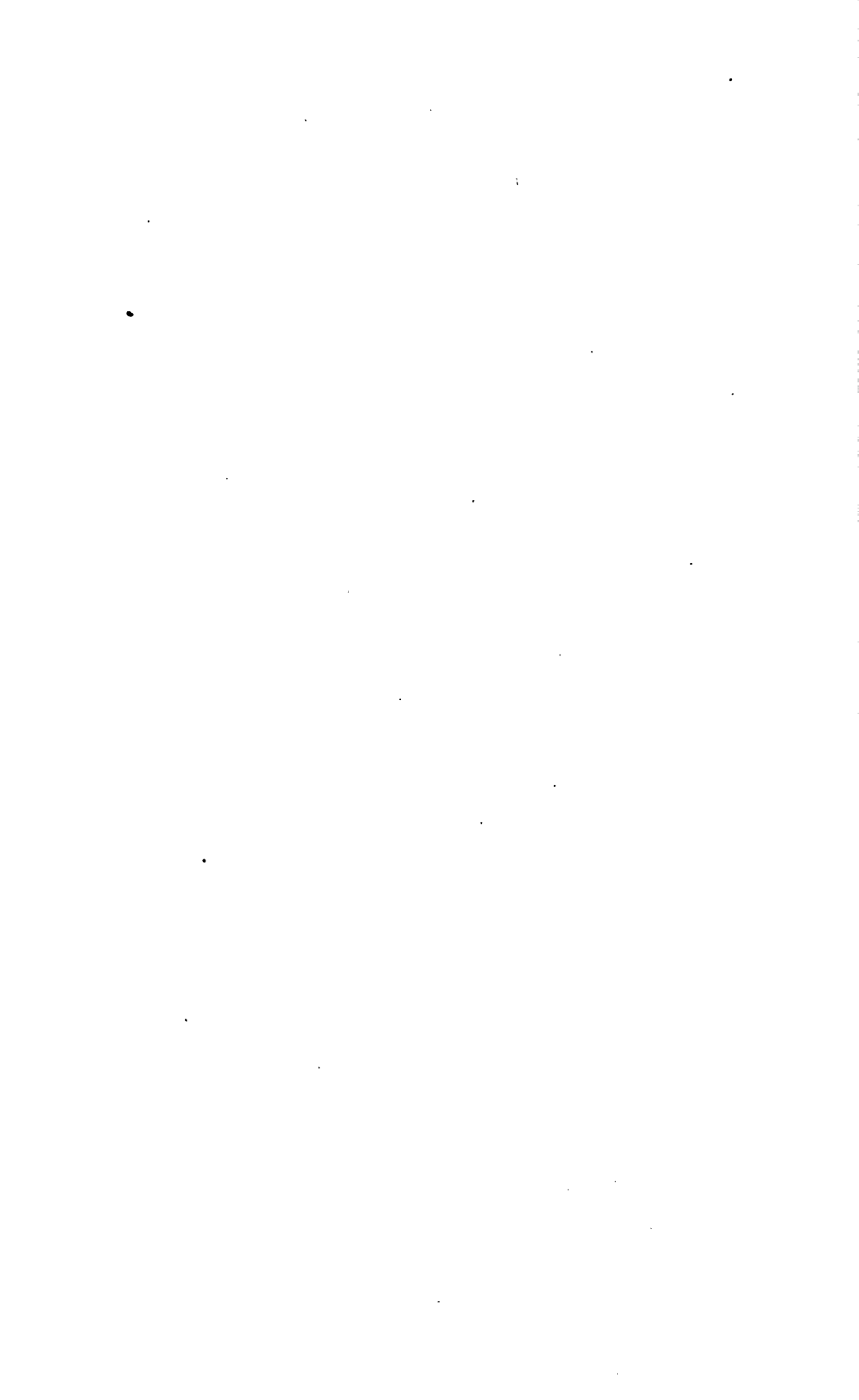
On motion the president of the Association was empowered to act in conjunction with the director of the Experiment Station, the presidents of the State Dairy Association and the State Livestock Association and the master of the State Grange, as a committee on Agricultural Improvement.

The matter of printing the proceedings was left to the executive committee.

Adjournment.

After a hearty vote of thanks to all those who had helped to make the meeting a success the convention adjourned to meet on the call of the executive committee in such place and at such time as they may select.





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